ANNALS OF MEDICAL HISTORY

PUBLISHED BIMONTHLY

NEW SERIES, VOL. VII, No. 6 NOVEMBER, 1935 WHOLE No. 82

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NEW YORK
PAUL B. HOEBER, INC., PUBLISHERS
SEVENTY-SIX FIFTH AVENUE

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Original articles are published only with the understanding that they are contributed exclusively to the ANNALS OF MEDICAL HISTORY. Manuscripts offered for publication, books for review, and all correspondence relating to the editorial management should be addressed to the Editor, Dr. FRANCIS R. PACKARD, 302 South 19th Street, Philadelphia, Pa.

Communications regarding subscriptions, reprints, and all matters regarding the business management of the ANNALS OF MEDICAL HISTORY should be addressed to the publishers, PAUL B. HOEBER, INC. 76 Fifth Avenue, New York City. [Cable address, Formed N. Y.]

The ANNALS OF MEDICAL HISTORY is published six times a year, the six issues comprising one volume. No advertising is carried. The subscription price is $10.00 a year, foreign $11.00. Current single numbers $2.50 per copy. A few sets of first series, Volumes I–X, are available in parts as published at $100.00 per set, or bound in boards, paper sides, canvas back, paper label, $135.00 per set. Price on available single volumes or numbers will be quoted on request.

Entered as second-class matter, June 2, 1917, at the Post Office, New York, N. Y., under the Act of March 3, 1879.

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Frontispiece
Annals of Medical History
November, 1935

JAMES CLARKE WHITE

⟦1833-1916⟧

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ANNALS OF MEDICAL HISTORY

New Series, Volume VII November, 1935 Number 6

JAMES CLARKE WHITE

THE FIRST PROFESSOR OF DERMATOLOGY IN AMERICA

By PAUL E. BECHET, M.D.

NEW YORK CITY

IN the quiet town of Belfast, Maine, the fifth-born child of James P. White and Mary Ann Clarke came into the world on July 7, 1833. I am sure that had the mother of the newborn babe foreseen his future distinguished career, it would have added much to her preexisting joy. The baby received the name of James Clarke White.

His ancestors were English but as early as 1725 came to America from Ireland, whither William White had migrated, and in 1689 had served as Captain in the siege of Londonderry against James II. His American ancestors were patriots in the Revolution, and prominent in the early history of New Hampshire and subsequently of Maine. His father had extensive shipbuilding and manufacturing interests, was Mayor of Belfast, Maine from 1861 to 1863, and State Senator from 1863–64. He died in 1879, at the age of seventy-eight.

James C. White as a baby was sturdy and healthy, and as babyhood was succeeded by childhood this splendid state of health was maintained by the many chores of a boy of that period, with the relaxations of fishing, swimming and sailing, for which pleasures the bay and river afforded boundless opportunity.

Much of White's private education was delegated to women. A Miss Wetherbee was followed by Miss Burrill, who in turn was followed by Miss Barnes. He eventually studied under a gentleman by the name of Mr. Pingree, who was most generous with the rod. White records an instance in which the worm turned, in the shape of an athletically inclined scholar who, reciprocating, gave Mr. Pingree a severe beating.

By 1845 the town's academy, which had burned, was rebuilt, and young White's education was undertaken more seriously. At the age of sixteen he passed the entrance examinations at Harvard, was duly installed as a Freshman in 1849, and for the ensuing four years worked assiduously, but at the same time gave himself sufficient relaxation. It was at this time that his life's interest in ornithology and botany became manifest.

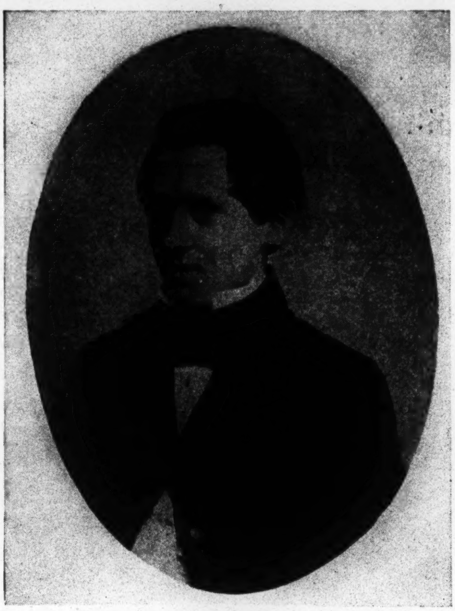
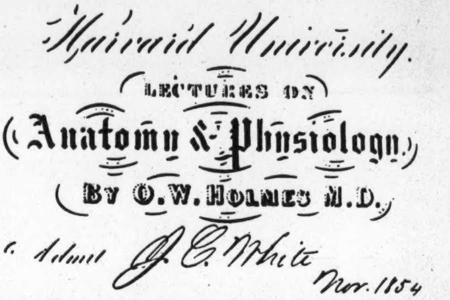


Fig. 1. James C. White. Class 1853. Harvard University.

He graduated from Harvard in 1853. Among his classmates was one Charles W. Eliot. At his graduation dinner in Harvard Hall he sat next to a graduate of the class of 1787, who had known Washington.

White entered the Tremont Medical School in September, 1853. This school, founded in 1838 by Drs. Bigelow, Storer, Reynolds and Holmes, had a semi-official connection with Harvard, its teachers were professors in the Medical Department of the University, and the functions of the school were suspended when the regular courses of the Medical Department of Harvard began. The seven professors at Harvard at this time were Oliver Wendell Homes, Anatomy and Physiology; Jacob Bigelow, Materia Medica and Clinical Medicine; John Ware, Theory and Practice of Physic; Walter Channing, Obstetrics and Medical Jurisprudence; J. B. S. Jackson, Morbid Anatomy; H. J. Bigelow, Surgery; and J. P. Cooke, Chemistry. These gentlemen gave their lectures during November, December, January and February, and had entire control of the affairs of the school. The most popular lectures were those of Dr. Henry J. Bigelow and Dr. Holmes. The latter never neglected an opportunity for a pun or witty saying. During a demonstration of the bile ducts, Dr. Holmes overheard a remark by White to a fellow student that he preferred his ducks roasted, whereupon Dr. Holmes stopped his lecture, walked up to White, and said, "young man, aren't you usurping my prerogative?"


Harvard University.

LECTURES ON

Anatomy & Physiology

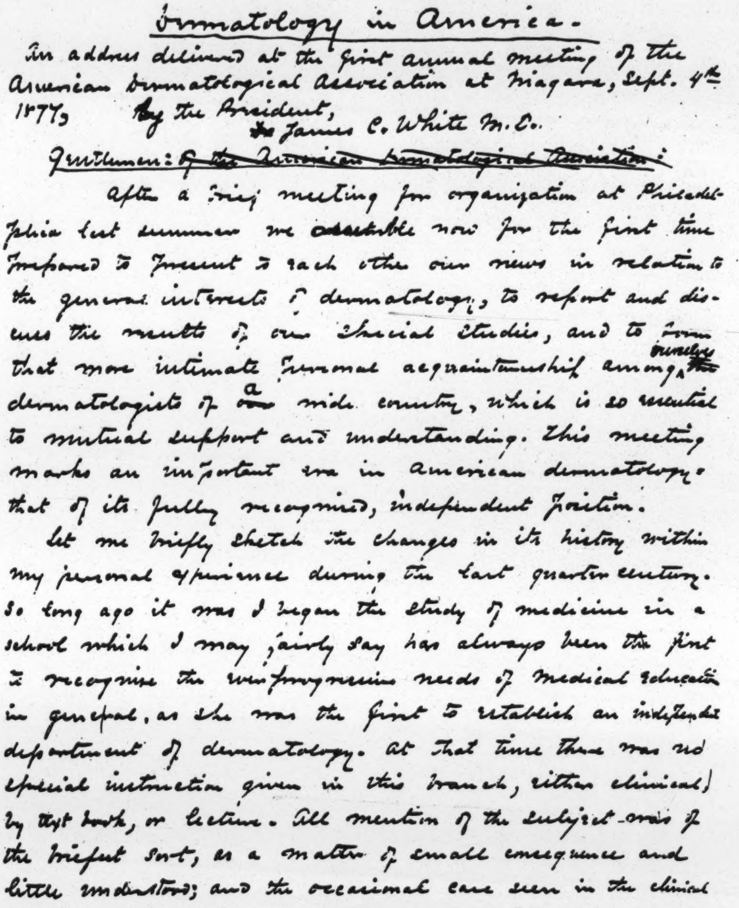
BY O.W. HOLMES M.D.

Admit J. C. White

Nov. 1854

Fig. 2. Card of Admission to Dr. Oliver Wendell Holmes' Lectures.

White worked assiduously throughout his career as a medical student, paying particular attention to chemistry. On February 20, 1855, White observed Professor Cooke condense carbonic acid to a solid state. Little did he realize at the time what a valuable agent this was to prove in dermatologic therapeutics. At the close of the Winter of 1855, White passed all his examinations, and received his degree of Doctor of Medicine. At the end of April, 1856, his term of service at the Massachusetts General Hospital, as "house pupil" expired, and he spent the months of May and June in the chemical laboratory of Professor Cooke. Believing his preparation for medical practice inadequate, White sailed for Europe for post-graduate study, in August, 1856, on the ship-rigged, side-wheeled steamer, *City of Washington*. She was the same steamer which subsequently was to transport Garibaldi and his troops to Naples in the war for Italian Independence.



Dermatology in America.

An address delivered at the first annual meeting of the American Dermatological Association at Niagara, Sept. 4th 1877, By the President,
~~Dr~~ James C. White M.D.

Gentlemen: ~~of the American Dermatological Association~~:

After a brief meeting for organization at Philadelphia last summer we ~~assemble~~ now for the first time prepared to present to each other our views in relation to the general interests of dermatology, to report and discuss the results of our special studies, and to form that more intimate personal acquaintanceship among ourselves ~~the~~ dermatologists of a ~~our~~ wide country, which is so essential to mutual support and understanding. This meeting marks an important era in American dermatology: that of its fully recognized, independent position.

Let me briefly sketch the changes in its history within my personal experience during the last quarter century. So long ago it was I began the study of medicine in a school which I may fairly say has always been the first to recognize the ever progressive needs of medical education in general, as she was the first to establish an independent department of dermatology. At that time there was no special instruction given in this branch, either clinical, by text book, or lecture. All mention of the subject was of the briefest sort, as a matter of small consequence and little understood; and the occasional case seen in the clinical wards of the hospital was looked at more as an object of curiosity

FIG. 3. A PAGE OF DR. WHITE'S ADDRESS AS FIRST PRESIDENT OF THE AMERICAN DERMATOLOGICAL ASSOCIATION, AT ITS FIRST MEETING AT NIAGARA FALLS, SEPTEMBER 4, 1877.

White's descriptions in his autobiography of the social life, art, and celebrated personages of the Europe of that period make fascinating reading. His post-graduate studies did not begin before October, 1856 when he settled down to work in Vienna under the tutorship of such men as Hebra, Oppolzer, Heller, Skoda, Sigmund, Hyrtl and Rokitansky. It was at this time that White developed a penchant for dermatology, and the greatest part of his time was spent in increasing his knowledge of that subject.

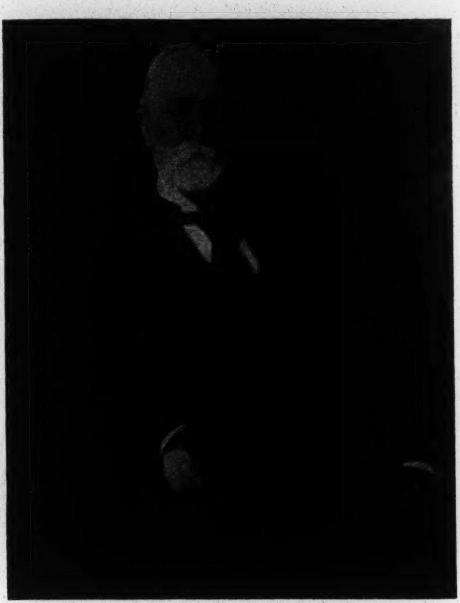


Fig. 4. Painting by Vinton Which Hangs in the Faculty Room of Harvard Medical College. Dr. White Called It "A Successful Likeness."

In 1857 he returned to America, and in November of that year opened an office in Boston in the Hotel Pelham, at the corner of Boylston and Tremont Streets. It was the first large apartment house erected in Boston. White went into general practice, declining, however, all obstetrical and surgical work. His interest in dermatology remained keen, and he never missed an opportunity to widen his experience in that branch of medicine.

In 1858 he was appointed instructor in chemistry in the Medical School, and later was made chemist to the Massachusetts General Hospital. In 1866 he was made adjunct professor of chemistry, and continued this work until 1871.

In 1860, White in conjunction with Dr. B. Joy Jeffries opened a dispensary for skin diseases in Eliot Street which continued until 1863, when he became physician to the out-patient department of the Boston Dispensary and received his first dermatological appointment as lecturer on diseases of the skin at the Harvard Medical School. In 1870 a department for skin diseases was created by the Massachusetts General Hospital and offered to White. He served this institution devotedly for thirty-three years.

In 1871, he had the signal honor of being awarded the first chair in dermatology to be established in this country. Both these events marked a turning point in his career. He now gave up his chemical teaching and general practice, and began the life work, in which he was to shine so brightly. He retained both positions for twenty-one years, and in that space of time devoted all of his exceptional abilities to the advancement of his specialty. He labored assiduously in the cause of medical education, and under the leadership of President Eliot many sadly needed reforms in medical instruction were accomplished. He was alone largely responsible for the increase of teachers, and courses at the Harvard Medical School, and realized the total inadequacy of the medical instruction of the 70's, 80's and 90's.

White joined the Massachusetts Medical Society in 1856, and became its President in 1892. In his early years he joined the Boston Society of Natural History and served as its curator from 1858 to 1868. White was Chairman of the Section of Dermatology and Syphilology of the International Medical Congress held in Philadelphia September 4 to 9, 1876.

Previous to this Congress at an informal meeting held in the rooms of the Section of Practical Medicine of the American Medical Association in Philadelphia on Wednesday, June 7, 1876, the following men: Louis A. Duhring, Philadelphia; Lunsford P. Yandell, Louisville; George Henry Fox, New York; L. D. Bulkley, New York; Edward Wigglesworth, Boston; and J. E. Atkinson, Baltimore, issued a call to some fifty physicians in the various parts of the United States, in reference to the organization of an American Dermatological Association. Among the first of the twenty-three gentlemen who responded to this call was James C. White. At the organization meeting on Wednesday, September 6, 1876 at 6:00 P.M., the following officers for the ensuing year were elected: President, James C. White; Vice-Presidents, Louis A. Duhring and R. W. Taylor; Secretary, L. Duncan Bulkley; Treasurer, James N. Hyde. The first meeting of this historic body occurred on September 4, 1877, at Niagara Falls, and the subject chosen by White was naturally the one nearest his heart, "The Development of Dermatology in America." Twenty-one years later he was again elected President, and his address this time dealt mostly with the future needs of American Dermatology.

In 1907, a great and unsought honor was awarded him, in the shape of the Presidency of the International Dermatological Congress, which was held in New York. The outstanding men of the dermatological world who were his subordinate officers at this memorable meeting are an eloquent testimony of the esteem in which White was held by his fellow dermatologists. As his fame grew apace, he was elected to corresponding membership in the French and Argentine Dermatological Societies, and honorary membership in the Dermatological Societies of Italy, London, Vienna, Berlin and New York. His literary work was extraordinarily prolific, and it would be difficult to select any particular items, in view of the general excellency of the output. There are however, several monographs which must be mentioned specifically, because of their outstanding character and great value to cutaneous medicine. The first of these was a 210 page book published by Cupples and Hurd, Boston, on May 14, 1887. The title of this book was "Dermatitis Venenata: An Account of the Action of External Irritants Upon the Skin." It was the first presentation of this important subject in dermatologic literature, and its value was greatly enhanced by White's expert knowledge of botany.

In June 1889, an article entitled "A Case of Keratosis (Ichthyosis) Follicularis" appeared in the *American Journal of Cutaneous Diseases.* This was the first description of a disease which a few months later was reported by Darier, and now bears his name. On August 31, 1882, White read a paper entitled "The Question of Contagion in Leprosy," before the American Dermatological Association. In this address he dwelt at length on the contagious nature of the disease. So early an advocate of this fact was he, that in the subsequent discussion only one member agreed with him. White was specially interested in, and contributed many papers on keratosis follicularis, leprosy, angioma serpiginosum and dermatitis venenata.

Between 1856 and 1913, he had contributed to medical literature 125 medical papers, 50 reviews, 94 editorials, 12 addresses, and 8 books and chapters, the overwhelming majority of which were on dermatologic subjects. In 1913, at the age of eighty, White retired, still retaining the robust health, zest of life, and love of medicine which had been manifest throughout his long and useful life. His health did not begin to fail until a year before his death, which occurred in Boston, on January 5, 1916. Death could not wholly defeat him, however, for he triumphed over it, by extending his usefulness to dermatology, when his life ended, through a devoted son, who has gained a high place in the esteem and affection of American dermatologists. Charles James White, by his own merit, has succeeded most admirably in carrying on the high example set by his distinguished father.

James C. White lived a full life. He knew how to work and how to play. With abundant health, fame, a splendid family, ample means, a devoted wife, and such hobbies as botany, natural history, porcelains and colonial furniture, he was indeed a happy man. He even lived long enough to witness the enormous progress of his beloved specialty, in that vast domain in which he lived and worked, and when he passed into the great beyond he left a name which will forever shine as a "beacon light" in the sea of future medicine.

In closing this humble effort to record the high-lights of his career, I wish to acknowledge my indebtedness to his "Sketches From My Life." It is a modest and pleasant book, and as a chronicle of the dawn of American Dermatology, it is invaluable.

SOME ACCOUNT OF DAVID SAMWELL, THE WELSH SURGEON, EYE-WITNESS OF THE MURDER OF CAPTAIN COOK, FEBRUARY 14, 1779

By PROFESSOR D. F. FRASER-HARRIS, M.D., D.Sc., B.Sc. (LOND.), F.R.S.E.

LONDON, ENGLAND

CAPTAIN Cook the great English circumnavigator was murdered by natives of Otaheite in presence of a party of his men who had taken him ashore from his ship, the *Discovery*. The only educated eye-witness of this catastrophe was a ship's surgeon, a Welshman, David Samwell, who left two accounts of the scene. One of these was in his own ship's log, the other in a "Narrative of the death of Captain James Cook &c.&c" published in London in 1786.

David Samwell was born on October 15, 1751, the son of William Samuel, the Vicar of Nantglyn and grandson of Edward Samuel of Llangar.

The reason of his spelling his name "Samwell" is not known. He was baptised on November 2nd, according to the entry of the baptism in Nantglyn Parish Church.[1]

Samwell must have studied medicine somewhere although no record of where it was has come down to us, for on October 5, 1775, he presented himself for examination at the College of Surgeons and was proved qualified to act as "surgeon's mate," that is, assistant or mate to the ship's surgeon.

Samwell found himself appointed as surgeon's mate to the *Resolution*, one of the two ships which Captain Cook commanded on his third and last voyage to discover the North West Passage in 1776.

The surgeon of the *Resolution* was a Scotsman of the name of Anderson who died of consumption on August 3, 1778. Mr. Law, surgeon of the other ship, the *Discovery*, was appointed to the *Resolution* so that he became Samwell's superior officer. Later, Samwell was appointed surgeon to the *Discovery*.

Anderson had been surgeon's first mate of the *Resolution* on the previous voyage and had not only made a collection of plants and "curios" but had taken the trouble to learn the Otaheite language. The plants etc. he left to Mr. (later Sir) Joseph Banks, his papers to his relatives in Scotland and his books to "the Surgeon's First Mate of the *Resolution*" who happened to be Samwell himself. Samwell thus received an unexpected addition to the little library he had taken with him to relieve the tedium of a long voyage.

Heinrich Zimmermann, a German who sailed under Cook and who kept a diary, has nothing but praise for the efficiency of the surgeons in both the ships.

On February 14, 1779, Captain Cook was clubbed and then stabbed to death by a party of infuriated natives at Karakakoa Bay on the island of Hawaii to which Cook and his escort had gone to recover a stolen boat.

---

[1] For some of the facts of Samwell's life I am indebted to the courtesy of Mr. William Ll. Davies, M.A., Librarian in the National Library of Wales, Aberyswyth, who kindly allowed me to use his notes for a paper on Samwell which he read at a meeting of the Honourable Society of Cymmrodorion in March, 1927. The account of Samwell in the D.N.B. is not wholly accurate.

The escort seems to have been singularly ineffective for Cook, while semi-conscious, actually struggled for some time with his murderers who were endeavoring to drown him. Samwell makes it perfectly plain that it was due to Cook's forbearance and humanity that the armed escort did not fire sooner on the savages to prevent their closing in on him.

Samwell's account or "log" is a detailed and well-written story of this most unfortunate and, in a sense, avoidable occurrence. He gives a brief description of the burial of Cook's body at sea on February 21, 1779, and the salute of ten guns accorded him. This "log" is preserved in the British Museum where it is catalogued in Vol. I of the "Class Catalogue of MSS." thus:

> E. G. 2591. Journal of David Samwell, Surgeon of the *Discovery* in Captain Cook's voyage to the Pacific Ocean, 10 Feb. 1776 29 Nov. 1779. Autograph (Purchased at Sotheby's, 9 Dec. 1881).

Most of the earlier pages have been remounted and bound with a strong broad margin. A typical page measures 9½ × 6½ inches.

The Journal which is written in a clear, sloping, "feminine" hand in ink now faded to a brown color is embellished with some illustrations. The title page reads: "Some Account of a Voyage to the South Seas in 1776–1777–1778 written by David Samwell, Surgeon of the Discovery."

On the page following the title page there is the portrait of Samwell "done in Paris in 1798." This is a silhouette.

Figures 3 and 4 are woodcuts taken from some book and stuck in here. Then on the two following pages facing each other are woodcuts of "A man of Prince William's Sound, and A woman of Prince William's Sound engraved for Banks's New System of Geography."

The Journal begins thus without any preface whatever—"February 10th the *Resolution* and *Discovery* were in commission at Deptford and the command of them given to Jas. Cook and Chas. Clark Esqrs to go on an expedition for the Discovery of the North West Passage by the South Sea."

The journal gives a detailed description of all the activities in which Cook's men were engaged among the various islands. Samwell supplies a short glossary of native words, and remarks that the words of the war-songs of the natives, whom he calls "Indians," as he heard them sung conveyed to him no meaning whatever. He sets them down phonetically. He seems to have heard "a song of lamentation which they sing at burials."

Such is the original MS which contains the account of the murder of Captain Cook.

Here and there the spelling is unconventional: "cabbin," "dead bodys," "I had wrote down," "vallies."

Samwell wrote the account of the death of Captain Cook for the Rev. Andrew Kippis, D.D., F.R.S. whose "Life of Cook" was published in 1788. But Samwell had previously published his own narrative in a small and now rare volume to be seen in the British Museum: "A narrative of the death of Captain James Cook to which are added some particulars concerning his life and character and observations respecting the introduction of Venereal Disease into the Sandwich Islands by David Samwell, Surgeon of the *Discovery*, London, printed for G. G. J. and J. Robinson, Pater Noster Row. 1786." It is in this little volume that Samwell declares that the portrait of Captain Cook by Dance engraved by Sherwin is the only one he ever saw that was like him.

Samwell has some interesting remarks about scurvy. He refers to the fact that it was Captain Cook himself who discovered how to banish that tiresome and deadly disease from the crews of ships compelled to be away from land for any length of time. Samwell mentions that Cook read a paper before the Royal Society on these dietetic reforms for which he was made a Fellow,[2] but Samwell does not add the fact that Cook was awarded the Copley medal for his important and humane research (1776). The enormous improvement in the health of Cook's crews is recorded by Samwell who relates that the *Resolution* lost only five men, three of whom were ill when they signed on, while the *Discovery* lost none. This was indeed a new order of things for at the date of Cook's voyages it was quite a usual thing for a ship to lose from half to two-thirds of her men from scurvy or from typhus ("ship") fever in a single voyage.

To the problem of the introduction of syphilis into the Sandwich Islands Samwell in this book devotes a good deal of attention. However introduced, he was deeply concerned to observe the amount of venereal disease in these beautiful islands and amongst such a handsome and contented race as the Hawaians were. He writes, full of emotion:

> Who would not sooner remain ignorant of the interesting discoveries which have been made, than bear the reflection of their having been attended with such an irreparable injury to a happy and uncontaminated race of people.

Samwell fully discusses the evidence for and against Cook's sailors having introduced syphilis both to the Friendly Islands and the Sandwich Islands, and comes to the conclusion that it was not introduced by them. He says that it was a point in dispute between Captain Wallis and Monsieur Bougainville which of *their* ships introduced venereal disease into Otaheite. He admits that Captain Cook himself was under the impression that his men did leave it at the Friendly Islands, but he is perfectly certain that syphilis was in the Sandwich Islands long before Cook's men ever saw them.

Samwell avers that Captain Cook on the former voyage was very particular that no men who were ill should go ashore anywhere for provisions, and he allowed no women to come on board. The second time they visited the Sandwich Islands eleven months later, Samwell tells us that venereal disease was in the Islands of Mowee and Ouwhyee at neither of which had the ships touched before. Further, syphilis was commoner in the island of Ouwhyee then in Atowi which Cook had visited. After much more to the same effect, Samwell remarks that the priests knew of the disease and pretended to cure it, which it is not at all likely they would have done had it only been introduced by the English less than a year before. Of course, since Samwell's time we have learned of the very contagious nature of syphilis and of its invisible parasite being transmitted by ways and means quite unsuspected by people of Cook's day.

---

[2] *Phil. Trans.*, Vol. 66, Appendix p. 39.

The sagacious Welsh surgeon was, however, no ascetic insensible to the attractions of female beauty.

It would seem that the ships had met with some Russians who remonstrated with Samwell and his shipmates for associating with the native women on the ground that they were not "Christians." Apropos of this Sclavonic tenderness of conscience, the Welsh surgeon writes in his journal:

> Where the brand of Nature has lavishly adorned the form of a fair damsel and spread the bewitching bloom of beauty in her lovely face—blind sinners that we are—we could never yet perceive the want of the finger of the priest to mark her forehead with the Sign of the Cross.

From this we may gather that David Samwell could express himself vigorously and gracefully; and we know he wrote verses both in English and in Welsh. The beauties of one poem in the Cymric which he wrote aboard the *Resolution* between New Zealand and Tahiti must be sealed from those who do not understand the Welsh language, but luckily he wrote also in English. On December 24, 1794, he was moved to express his thoughts about the tempests and gloom of the polar winter, the ships at that date being about 63° latitude North.

In common with all sailors and most landsmen Samwell believed that the moon influenced the weather:

> Then hail, New Moon, the poet's friend,
> Our wearied hopes must now depend
> On thy renascent light;
> O calm the ocean and the air,
> Convert this adverse wind to fair,
> And gild the Polar night.

We can doubtless remember having read much worse poetry than this from much more famous pens. Samwell's little poem, "The Negro Boy," enjoyed at one time a wide popularity.

When not at sea, Samwell lived at 117 Fetter Lane, whence he would often go out of an evening to meetings of the Gwyneddigion Society, founded in 1770, of which he was for a time Secretary and later President.

From all we can gather, Samwell was a friendly, "clubable" man, skilled in his profession and pleasant to meet in private life. He took a great deal of interest in his native land, and particularly in the Eisteddfod.

A part of the last year of his life (1798) Samwell spent at Versailles in charge of some prisoners of war, for at that date Great Britain was at war with France. Dr. Samwell, who never married, died on November 23, 1798, at his house in Fetter Lane, Fleet Street, and was buried in the Churchyard of St. Dunstan in the West, Fleet Street.[3]

Samwell's will is at Somerset House, and Mr. Davis has given it in full in his monograph previously referred to.

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[3] The D.N.B. gives his burial-place as St. Andrews, Holborn.

GRECIAN ATHLETIC TRAINING IN THE THIRD CENTURY (A.D.)*

By BURGESS GORDON, M.D.

PHILADELPHIA

IT seems that before the Persian Wars there was no system among the Greeks of organized athletic training or competition. The contests were essentially religious festivals of which the Olympiad, in honor of the Olympic Zeus, the King of Hosts, was the most important. It is recognized in the literature that the Greek youth was taught to care for his body and to be moderate in eating and drinking. It was considered an honor to compete in the Olympic Games and this was an inspiration to maintain a healthy body. Some of the successful athletes became trainers and from their experiences with diets and various exercises developed methods for training others.

It appears that professionalism entered about the middle of the fifth century B.C. The old methods of training were discarded. Competition became more strenuous and it was necessary for the young athlete to devote himself seriously to rigorous exercises. It was during this period, the latter part of the second century, that Galen wrote his exhortation on the study of the Arts.[1] He said:

> Take care not to be seduced by an impostor or charlatan who will teach you a useless or contemptible profession. Learn that an occupation which has no sensible end in life is not an art. Man stands between the Gods and the animals, near the first on account of his intellectuality; with the second because he is immortal. When athletes miss their goal they are disgraced; when they attain it they are not yet even above brutes.

In later addresses he urged intellectual development rather than athletic prowess and this was significant because he was an ardent advocate of exercise and a skillful wrestler. This recalls the sentiments of Euripides who said, "A thousand evils afflict Greece and not one greater than athletics." Hippocrates, preceding Galen, condemned athletics saying "athletic development is not natural, much better the ordinary healthy condition of the body. The maintenance of health depends on the avoidance of satiety in eating and fatigue in exercise." Apparently all philosophers in Galen's time disapproved of athletics even on the side of beauty. They believed the Pancratiasts and pugilists acquired a disgraceful figure and their countenances were hideous. As also described by Galen:

> They lose their eyes and their teeth and their limbs are strained. Even their vaunted strength is useless. They dig and plow but they cannot fight. They cannot endure heat and cold nor like Heracles, wear one garment winter and summer, go unshod and sleep on the open ground; in all this they are weaker than new born babes. . . . It is easy to discover they are always in debt. While practising their profession and afterwards they are never

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[1] Walsh, J. Galen's second sojourn in Italy. *Med. Life*, 37: 474 (Sept.) 1930.

* Read before the Section of Medical History, College of Physicians of Philadelphia, March 13, 1933.

found richer than the high class servants of an opulent man.[2]

Opposed to the opinions of Hippocrates, Galen and others, on the question of athletic training, was a small conservative group. They recognized the seriousness of the present system but were fearful of even greater dangers in newer methods. They believed the athletes should return to the system of the old trainers. The Sophists were especially active in this group and an important figure was Philostratus.[3] He wrote "Gymnastikos" during the early part of the third century, perhaps as a direct reply to Galen's attack and to revive interest in the old athletics. He presented his views in "wise-acre" fashion typical of Sophists of his day who loved to discuss all topics both pro and con.

Philostratus described[4] a youth as "not large but he was a skillful wrestler." When he had fallen into disease which weakened both his right and his left hand and he had given up entering decisive contests a dream warned him that he *could* resist disease; also that unless he did defy it, he would not only lose the power of his arms but his whole body would perish. He pointed out that "will power can bestow a great deal on any man." The best condition of the body according to Philostratus is "that which is warm and at the same time moist, a natural, pure and clean condition. Those in whom floats the humor of phlegm and bile, for the sake of excellency of the constitution, through various exercises, are made suitable for labors which they ought to do easily (through exercise) and they are freed from the use of clay and mud and irksome medicines" which are now recommended by the doctors. As the warmth of the amphitheatre is an aid to the contenders, just so the spirit strengthens with encouragement. The weaker athletes with handicaps of sluggishness need constant stimulus and it is necessary to cover them with powder and olive oil. In comdemning the present methods and results he draws attention to the old system. "Some of the athletes were trained by carrying heavy burdens; others in combat with horses or leopards; others by raising and bending iron into a tangled mass; others by subduing bulls and even lions." Polymestor, Glaucus, Alesia and Scotussanean Polydamus, victorious athletes who later became trainers, were sensible. They "bathed in rivers and springs and slept on the ground, sometimes on stretched skins or couches made from material gathered from the meadows. . . . Of food they had porridge and bread, not well cooked or leavened, the flesh of cows, bulls and goats. They were anointed freely with oil." The athletes entered as many as eight Olympiads[5] and enjoyed a long life. He attributed this to the simple diet, work and a general healthy state.

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[2] Gardiner, E. N. Athletes of the Ancient World. Oxford Press, 1930.

[3] Philostratus was born about 170 A.D. and died about 245 A.D. It is thought that he was born in Lemnos, studied and taught in Athens and finally settled in Rome. "Gymnastikos" was written apparently several years after the death of Galen.

[4] Translations from the original Greek "Gymnastikos" (written in the early part of the third century) and Philostratei Libri de Gymnastica, a Latin translation by C. L. Kayser, Heidelberg, 1840 (volume in the library of the University of Pennsylvania).

[5] In recent years it has been rare for athletes to compete in more than two Olympics. Most baseball players, football players and wrestlers and boxers are "through" before the age of forty. Undoubtedly the keener competition and greater speed which

With the advent of physicians there was apparently a striking change in the plan of selecting athletes and men for the armies. "The reluctant were weeded out from the eager, the delicate from the robust." The athletes were effeminate. This was attributed to luxurious living and rich Sicilian foods. The new trainers under the direction of doctors ordered the "slothful athletes to sit and stuff before the exercises just like the Libyans and Egyptians, bringing in cooks and bakers for the satisfaction of their pleasures who fed them on bread made from poppy head, difficult to digest." They unlawfully accustomed the athletes to the eating of fish, crediting different qualities to certain tribes of the sea, as for example, those living on marshy places were fat, those in rocky places tender, those in the deep sea fleshy and those in seaweed poor and thin on the sides. The new trainer even taught the mysteries about the fleshy swine, for he warned that they had herds grazing near the sea that were harmful food because the shores were full of rich sand, neither should they eat those which were fed near the rivers on account of the eating of river crabs, recommending for the athletic diet only those that were fed on cornel wood acorn.[6] The modern dietetics were regarded by Philostratus as fads and fancies which inclined toward luxurious living and as important causes for dishonesty and unemployment:

> Unlawful contests have occurred since the competitors can buy or sell victories. It is a time when one buys his own fame, because it is pitifully absent from many; another loses a victory gained by no work because he has lived luxuriously. Also when the bankers attend the games they lend money to athletes at much higher interest than would be charged to those building ships. They trade on the strength of the athlete while they look out for their own advantage.

Professionalism had been a great mistake. It abolished "eagerness from the athlete" for this was the quality which enabled him "to stand against all the new ones from the tribes of Helice and Phoenix who had practised most diligently."

Philostratus described the modern athlete who had dined luxuriously and been pampered by the trainers:

> The thick eyebrow indicates the more gluttonous. He breathes heavily and has a prominent cupping of the tendril,[7] slanting of the loins with some swelling. Those full of wine have fatter bellies, florid color, effeminate loins and are weak in the body. In the exercise of sexual pleasures they deteriorate in strength and are short of breath. They lose their daring and soon grow feeble in their labors. These are seen when examining their naked bodies—the curve of the nail, the weakness of the hip joint, the flabbiness of the skin around the ribs and the cold blood. The places under the eyes are sunken, the beating of the heart is weak, the sweating is poor, sleep inadequate, all of which hinder the digestion; and

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are present today did not exist in the time of Philostratus.

[6] The new trainers were perhaps correct in advising about the hogs which fed near the sea. The hogs may have been improperly nourished due to the intake of sand and seaweed.

[7] "Cupping of the tendril" may indicate an increase in the supraclavicular and infraclavicular fossae with development of "round shoulders."

there is a stroke of ophthalmia,[8] the sure sign of passion.

On the subject of sexual pleasures he believed that those who indulged were men who "prefer loathsome pastimes to wreaths and the proclamation" and "if these pleasures are continued the athletes will lack endurance, strength and breath." He teaches that "exercise greatly overcomes the desire." In these "there is sometimes a dreaming off of the seed which relieves the condition and is sexual pleasure but it is not self-sought. If properly exercised the enduring strength is greatly increased. Furthermore, the sweats are expelled."

He pointed out a specific mistake in athletic training so as to emphasize that which he had written—the mistake committed by Gerenius, the wrestler:

> His tomb on the right side of the road from Athens which leads to Eleusis is an argument against the tetrades[9] which I have repudiated. When he was reported victor in the Olympian games and when on the third day after that he received some of his companions at a regular banquet he was immoderate in his celebrations, as he was deprived from sleep so long; therefore, on the next day, coming into the Gymnasium he declared to the trainer that he had given way to himself in overloading his stomach and that he felt badly. Indeed, the trainer was exasperated and when his anger arose instead of breaking off and giving up the method of tetrades he carried on. The athlete died by his own ignorance.

The physical condition of the athlete of his day could be corrected, Philostratus believed, with the proper training. He advocated different exercises for those who took part in the Pentathlon[10] and those who took part in the Pancratium.[11] "The trainer is to bring back skill and invigorate the athletes and they will grow young again in proper exercises." He urged exercise, both light and heavy, and massage of the lower parts for the more gluttonous.

The runners should not overexert themselves but stride with leisure and with long steps,[12] if boxers they should exercise by beating heavy pieces of metal, thus that they may fight without difficulty to the extreme finger tips and if they are wrestlers they should have some exercises in building up the body in the Pancratium. The exercises are more useful if lengthened that they may develop the breathing.

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[8] A stroke of ophthalmia suggests nystagmus, perhaps the result of toxic influences. It is possible that it was largely intentional as in the case of "flirting."

[9] The "tetrad" was a programme of work lasting four days. On the first day the athlete was "prepared" by exercises consisting of light and quick movements; the second day he was "extended" by testing all of his powers of endurance; on the third he was "relaxed" by means of gentle movements; the fourth day consisted of movements of defense which left him in a middle state. This system was intended only for boxers and wrestlers. The principle of the gradual increase and diminution of work is sound and is one of the essential principles of the "Ling" system of physical training. The fault may have been in the application since no deviation from the routine was permitted and no consideration was taken of the individual's actual condition.

[10] The Pentathlon, consisting of the foot race, broad jump, discus and javelin throwing and wrestling, was characteristic of Greek athletic competition. Pentathlos means "jack-of-all trades" and the competitor was regarded perhaps as an "all-around athlete."

[11] The Pancratium or "Pankration," a combination of wrestling and boxing, was a refinement of the primitive hand-to-hand struggle without weapons.

[12] It was noted in a transcontinental foot race that English runners who used a similar stride had great endurance and were successful. Cf. Gordon, B., and Baker, J. C. Observations on the apparent adaptability of the body to infections, unusual hardships, changing environment and prolonged exertion. *Am. J. M. Sc.* (July) 1929.

In the special training of boxers Philostratus recommends the use of a suspended sack of sand.

The athletes, especially the lighter ones, are taught from the force and weight of the sand to stand firmly against their opponents and use their shoulders and fingers in repelling. The head is dashed against the sand and in the Pancratium the athlete takes additional exercises with the body in erect position.

In the summer, the inexperienced athletes should exercise but "everywhere and at all times, only those who have knowledge and reason." He believed the Northern suns (winter days) if they "are free from winds and break through the clear sky, are pure and warm, whereas the southern winds are humid, sluggish and oppressive beyond measure and are more likely to exhaust than to stimulate the athletes." In training those with weaker constitutions "especially athletes full of phlegm, the shoulders should be exposed to the sun; and those who are more advanced should be baked in the sun and rest in leisure just as if they enjoyed it; on the contrary those full of bile should be kept out of the sun lest fire should be poured upon fire."[13] Philostratus remarked somewhat sarcastically that since the new trainers as well as the physicians followed the Spartan influence and believed that much of the training should be done by the fire and by means of medicine instead of in the sun and by exercise, the Greek youth should leave to the Spartans the training which referred neither to the wrestling or boxing.[14] Doubtless the winning of games was not caused by their sort of exercising but in the "practice of submissiveness which is the goal of endurance, because it is their custom to sacrifice on the altars."

In caring for the body after exercise Philostratus recommends the use of "olive oil in proper measure because the body is covered with dust."

Slimy powder[15] is also serviceable. It opens the pores of the skin and stops the restraining of sweat; soft and bituminous, it warms the cold limbs; brunettes and blonds with dust on all sides are suited for this treatment. It restores the ruddy blonds and they are more pleasing in appearance. The body is freed from all powder by a wet hand with separated fingers as one who sprinkles water; some pour water over the head and shoulders of the athlete.

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[13] It is said the early Greek physicians believed the element water predominates in the mucus which is secreted by the brain, fire in the yellow bile which is secreted by the liver, earth in the black bile which is secreted by the spleen and blood which is secreted in the liver. The four elements are evenly mixed: mucus is cold and moist, yellow bile is warm and dry, black bile is cold and dry. (From the Reference Handbook of the Medical Sciences.) The passage "fire poured upon fire" may recall the expression "keep out of the sun on chill days" which is used in malaria districts in the South. It is believed that individuals with jaundice and malaria will experience a sharp elevation of temperature following direct exposure to the hot sun.

[14] It would seem that Philostratus believed that men aspiring to enter contests requiring strength should train out of doors and work whereas those interested in sports requiring less strength (perhaps "ping pong") may follow an easier programme. Philostratus apparently had less faith in the Gods than in a fixed regimen of physical training.

[15] "Slimy powder" may have been the forerunner of present day cleansing cream.

It would appear from the translations of Philostratus that he attempted to chart a middle course on the question of athletic training. He recognized apparently the need for new methods but was dissatisfied with the modern trend. He believed the athlete should live simply and exercise according to individual capabilities and requirements. In this he was undoubtedly correct. However, there was perhaps some misinterpretation on his part of the doctor's recommendations. It seems they advocated therapeutic measures and perhaps encouraged unmindfully luxurious living and restricted exercise. It should be emphasized however that they, especially Galen, were concerned chiefly with the dangers of professionalism and the influence of the charlatans. However, this may be regarded, Philostratus represented a school of "practical thinkers" who believed in moderate selected exercise and simple diets.

The turn of the second century and third century, in a sense, parallel the athletic situation of the present day in that elaborate training systems, the encouragement of youth to extend himself to the limits in proficiency and development and the general over-emphasis of athletics were criticized. In this it may be said that Galen and the Doctors, Philostratus, the Sophists and Philosophers agreed. Their differences of opinion were largely matters of degree and procedure.

SHAKESPEARE'S MEDICAL KNOWLEDGE: A STUDY IN CRITICISM*

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THE sixteenth century had little premonition of the true greatness it harbored in William Shakespeare. Absorbed in the pomp and intrigue of court life, and tuned to the madcap adventures of daring seamen, the century passed him by. His death was a matter of almost complete indifference. But the glory of England lay in that man. And he gilded the century into a veritable Golden Age of Literature. Today, Elizabeth is but a name and a memory, and the Spanish Armada recalls but an historical incident.But this man Shakespeare continues to be the crowning achievement of his century.

But Shakespeare wrote primarily in the field of drama and of poetry. It is within these two spheres of art, and only within these two spheres of art, wherein he is the true supreme creative genius. The phenomenon of idolatry that arose in the eighteenth century[1] and flourished so luxuriantly in the nineteenth, made of Shakespeare an all-pervading, all-comprehensive, all-knowing God-man. Even our own twentieth century is not free from it. Again and again, the commentators have dipped their pens, taxed their ingenuity for superlatives, ransacked their brains for fitting eulogies and ended in a confusion of exclamatory rhetoric. They have named Shakespeare a great scientist in almost every field of knowledge. They have made of him a classic scholar and a linguist.[2] They have invested him with a lawyer's knowledge of law. Finally, the medical idolators have outdone all the others and made of him a great physician and psychiatrist, with conceptions far in advance of the age in which he lived. The task of scholarship in the last thirty years, however, has been to bring back Shakespeare within the realm of intelligent appreciation as a creative artist in the poetic drama where he belongs.

As a result, Shakespearean criticism has found its true center of gravity. No more is emphasis placed on the poet's classical learning. No more are treatises written to prove that he was a student of law. No more is he termed botanist, astronomer, horticulturist, etc. Only in the field of medical and psychopathological knowledge do commentators still praise Shakespeare as a physician. Possibly the reason for this is obvious. Literary critics have feared to tread on unfamiliar ground. There are few critics who are doctors, and fewer doctors who are literary critics. At any rate the anomaly remains. Criticism of Shakespeare's medical knowledge, with few exceptions, has taken the form of exposition rather than that of adjudgment. Medical commentators have, for the most part, merely listed the references to medicine found in Shakespeare's plays and accepted them as evidence of the poet's medical learning. Very few have attempted to analyze these references or to evaluate them as true medical knowledge. It is the purpose of this paper to make this evaluation. We shall trace as completely as possible and adjudge as completely as possible the attitude of critical opinion on Shakespeare's medical knowledge.

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* This is one of a series of articles on Shakespeare's medical and psychopathological knowledge. The following have already appeared: "Medical Practice and the Physician in Elizabethan England and in Shakespeare's Dramas," *Med. Life*, 41: 331, 1934; "Shakespeare's Psycho-pathological Knowledge," *J. Abn. & Soc. Psychol.*, 30: 70, 1935; "The Acquisition of Shakespeare's Medical Knowledge," *Canadian M. A. J.*, 33: 319–326, 1935.

Generally speaking, practically all commentators concede to Shakespeare an extensive knowledge of the healing art. Thus, as far back as 1859, A. O. Kellogg speaks of the "extent and accuracy of the medical physiological . . . knowledge"[3] of Shakespeare, holding also that "there is scarcely a department of scientific knowledge which he has not enriched,"[4] and concluding that "the knowledge [he] displayed was very far in advance of the age in which he lived, and was not possessed by any one in his time, however eminent in any special department of science. . . . "[5] And as late as 1930 we find V. B. Green-Armytage speaking of "Shakespeare's enormous wealth of medical lore"[6] and remarking that " . . . it is astounding to discover the wonderful knowledge of physiology, pathology and psychology to which the plays bear witness."[6] Meanwhile, in the intervening years, voices of praise are hardly lacking. Thus, Gillespie (1875) writes of having "been struck, when reading Shakespeare, with the amount of medical knowledge he displayed. . . ."[7] Donnellan (1902) speaks of the poet's " . . . extensive knowledge of the art of medicine . . . so exact and intimate is his familiarity with the healing art. . . . "[8] Hagemann (1916) considers that he had a "profound knowledge of medical subjects" and that "his knowledge of medical themes was not only matchless but that in spots it was almost predictive."[9] Likewise, Knott (1903), Rogers (1914), Walter Lindley (1916), Sir St. Clair Thompson (1919), and others, all attest to "Shakespeare's intelligent familiarity with every branch of medicine,"[10] and with his "thorough mastery of the principles of the healing art,"[11] Knott going to the extent of holding that "Shakespeare's ideas were in advance of even the average medical knowledge of his time,"[11] Rogers adding that "from the twentieth century point of view, he was, and is a great physician . . . ," a "teacher of health" who "stands among the first,"[12] and Sir St. Clair Thompson concluding that " . . . Shakespeare is, and always must be, one of the greatest masters of medicine."[13] Indeed, when we consider that there are close to five hundred quotations containing references to medicine; when we consider that the plays show evidence of Shakespeare's familiarity with the most important medical theories then in vogue, we cannot wonder at the agreement of the critics. However, carried away by the idolatry that Schlegel, Coleridge, Hazlitt and others, infused into the century to the point of saturation, most of these commentators have succumbed to the temptation of substituting, all too often, a blind adoration for clear-eyed logic. Thus one of these critics, Robert Cartwright (1888), sees enough medical and pharmacological knowledge in Shakespeare's works to be actually deluded into the "conviction" that "Shakespeare must have been" not only "an Apothecaries'

Apprentice,"[14] but also a "Licentiate of the Apothecaries' Company";[15] and not only a "medical student," who "must at some period or other have studied medicine"[16] and "dissected in a school of medicine,"[17] but also a practicing physician "and a member of the Royal College of Surgeons,"[18] "such a mastery over the theory and practice of physic"[19] does he show! Thus, also, Hackman (1888) concludes that Shakespeare "must . . . have had opportunities of learning the practice of medicine. . . . "[20] And thus too, Orville W. Owen (1892) has come to a similar conviction, for he definitely states that Shakespeare " . . . must have been (if not a doctor of Medicine) a close student of our learned art,"[21] "a Master of Medicine."[22] This same commentator continues as follows:

> Was he an anatomist? Every portion of the human body known to his day is mentioned. Was he a student of physiology? Physiological functions are given in detail. Had he knowledge of Materia Medica? He speaks of many medicines . . . Was he a Neurologist? It might be called his speciality; . . . his wonderful descriptions and delineations in this great field of our science[23] [shows that he had] thoroughly mastered the subject in all its branches.[24]

In similar fashion, Wainwright (1904) comes to the conclusion that,

> We may with . . . certainty claim that he had been a student of medical science, for his works contain most marvelous references to this science which it has never been thought existed in his time, yet which reads today as if written by a twentieth century scientist.[25]

The trouble has been that these commentators have fallen into the error of regarding Shakespeare's medical knowledge not in the light of the medicine of the sixteenth century, but rather in the light of the medicine of modern times. They have brought to their tasks the preconceived premise that Shakespeare was endowed with a universality of knowledge not only of things in the past and present, but also of things in the future;[26] and they have attempted to draw out of his plays all manner of evidence to bolster this premise. Consequently these commentators have read into his works things which are not there at all. The tendency has been to give an all too liberal interpretation to the medical lore in the dramas. "The most careless and casual lines in his plays have been twisted and squeezed in the hope that they will yield some medicinal secret."[27] Matters of general medical knowledge, no doubt common to all people, have been considered as showing Shakespeare's unusual knowledge of the healing art. References to fever, fainting, diet, nausea, vomiting, puberty, the perverted appetite in pregnancy, seasickness, rheumatism, etc. are put down as showing Shakespeare's medical learning. Thus, Sir St. Clair Thompson, among other things, quotes the following lines from Shakespeare to prove his knowledge of medical science:[13]

> Stand from him, give him air; he'll straight be well.[28]
> So play the foolish throngs with one that swoons;
> Come all to help him, and so stop the air
> By which he should revive.[29]

Under the heading, "Open Air-Treatment" he says, "Three centuries before the profession had thought of open-air treatment, Shakespeare had advised:[30]

The most wholesome physic of thy health-giving air.[31]
I pray you give her air, Gentlemen.[32]

So Shakespeare was a great physician because he knew enough to call for air in case of unconsciousness from syncope! Upon such evidence do his commentators raise him up to the pinnacle of physicianship! Similarly, V. B. Green-Armytage[33] quotes the following lines from Shakespeare to show that he knew about quickening and the longings of pregnancy, and that consequently, he had unusual obstetrical and gynecological knowledge:

> Faith, unless you play the honest Trojan, the poor wench is cast away, she's quick and the child brags in her belly already, she's yours.[34]
>
> Sir, she came in great with child; and longing (saving your honour's reverence) for stewed prunes; sir, we had but two in the house, which at that very distant time stood, as it were, in a fruit-dish, a dish of some three pence; your honours have seen such dishes; they are not China dishes, but very good dishes.[35]

Likewise, such lines from Shakespeare as follow have been put down as evidence of his great mastery in the field of Medicine:

Many will swoon when they do look on blood.[36]
. . . a gaping wound
Issuing life blood . . . [37]
The Queen's in labour,
They say, in great extremity.[38]
What wound did ever heal but by degrees . . . [39]

Even the drugs mentioned in Shakespeare's plays, while not familiar to the average person today, were well known and even in common use in the days of Shakespeare. The fact that the grocers and apothecaries were united into one company certainly fostered such a knowledge of drugs, and particularly, of the plants from which they were derived. These grew on every roadside, and were recognized by every housewife. Thus foxglove or digitalis, mandrake or mandragora, hemlock or conium, the nightshade or belladonna, henbane or hyocyamus, monkshood or aconitum and many others, all entered into the daily lives of the people. Chaucer in his "Nonnes Preestes Tale" affords us interesting evidence in support of this:

A poure wydwe, somdel stape in age,
Was whilom dwellyng in a narwe cotage
Beside a greve, standynge in a dale. . . .

Hir diete was accordant to hir cote;
Repleccioun ne made hire never sike,
Attempree diete was all hire phisik,
And exercise, & hertes suffisaunce
The goute lette hire nothyng for to daunce,
Nopoplexie shente not hir heed;
No wyn ne drank she, neither whit nor reed; . . .

'Now, sire', quod she, whan we flee fro the bemes,
For Goddes love, as taak som laxatyf,
Up peril of my soule, and of my lyf,
I conseille yow the beste, I wol not lye,
That bothe of colere, and of melencolye
Ye purge yow, and, for ye shal not tarie,
Though in this toun be noon apotecarie,
I shall myself two herbes techen yow,
That shul been for youre hele and for youre prow;
And in our yeerd, the herbes shal I fynde,
To purge yow bynethe, and eke above
Sire, forget nat this, for Goddes owene love;
Ye been ful coleryk of compleccioun.
Ware the Sonne in his ascentioun
No fynde yow nat repleet of humours hoote;
And if it do, I dar wel leye a grote
Or an agu, that may be youre bane,
A day or two ye shul have digestyves
Of lawriole, centaure, and fumetere,
Or elles of ellebor, that groweth there,
Of katapuce, or of gaitrys beryis,
Or herbe yve growyng in oure yeerd, thay mery is;

Pekke hem up right as they grow, and ete
him yn.'[40]

Likewise, in Heywood's "The Playe called the Foure P.P." the "Poticary" mentions many drugs that must have been familiar to the common people in Shakespeare's day:

If ye wyll taste but thys crome that ye se,
If euer ye be hanged, neuer truste me!
Here haue I diapompholicus,—
A speciall oyntment as doctours discuse;
For a fistela or a canker
Thys oyntement is euen shot-anker,
For thys medecyn helpeth one and other,
Or bryngeth them in case that they nede
no other.
Here is syrapus de Byzansis,—
A lyttel thynge is i-nough of this,
For even the weyght of one scryppull
Shall make you stronge as a cryppul,
Here be other, as diosfiallios,
Diagalanga, and sticados,
Blanka Manna, diosopliticon
Mercury sudylyme, and metridaticon,
Pelitory, and arsefetita,
Cassy, and colloquintita.[41]

Nor is that all. Shakespeare has had foisted upon himself the weighty honor of discovering the circulation of the blood, one of the greatest discoveries in medical history. He has been considered as evincing a knowledge of the action of antitoxins.[42] He has been applauded as antedating Newton in the discovery of the laws of gravity.[43] There are other fantastic claims of like nature.[44] Suffice it to say, these claims probably have more root in the minds of the critics than in the mind of Shakespeare.

* * *

Let us now go into greater detail on the subject, chronologically. The sixteenth, seventeenth and eighteenth centuries are practically mute with regard to comment on Shakespeare's medical learning. Nor is this to be wondered at, for these centuries were generally more or less indifferent to Shakespeare's greatness.[45] It was not until the nineteenth century that the critics awoke to the all-sided, myriad-minded, universal genius evident in the plays of Shakespeare. But as is the way with human nature, these critics swung to the opposite extreme, and, as already mentioned, as a result of the leadership of Schlegel, Coleridge, Hazlitt and others of their school, the poet came to be idolized as an all-knowing, all-comprehensive "Oceanic" Mind. The attitude of criticism on his medical knowledge did not escape this spirit of idolatry. That Shakespeare was familiar with the medical lore of the times all critics agree. That he was acquainted with the principles and theories of the medical writers of the past and of his own time, few deny. But that he had any special or technical knowledge of medicine or that he made any scientific discoveries—here is where there are some differences of opinion. Nevertheless, as already stated, medical commentators, for the most part, seem to have been satisfied with exposition, and the mere listing of medical references rather than with real criticism. And so there are few works on Shakespeare's medical knowledge that are worthy of the critics' art.

As early as 1815, we find Bell's "Principles of Surgery," Vol. II, noting Shakespeare in the capacity of a physician:

> My readers will smile perhaps to see me quoting Shakespeare among physicians and theologists but not one of all their tribe populous though it be, could describe so exquisitely, the marks of apoplexy conspiring with the struggles for life, and the agonies of suffocation,

deforming the countenance of the dead. . . .[11]

It is obvious here, that this is rather a tribute to his sense of observation than to his medical knowledge. And who can deny that Shakespeare's powers of observation and his genius for language are unsurpassed? That is what his greatness rests upon. But we must beware of falling into the error of confusing such abilities with actual medical knowledge, as so many of the commentators have done.

Continuing further, George Farren published a book on the medical knowledge of Shakespeare in 1826, in which there are "Observations on . . . Rates or laws of Mortality . . . Illustrations of the Progress of Mania, Melancholia, Craziness, and Demonomania as displayed in Shakespeare's characters of Lear, Hamlet, Ophelia and Edgar: on the comparative danger of first and subsequent births, etc., etc." This work falls into the category mentioned before; it contains references to medicine in the plays but little criticism.

The most important and dominant medical critic of the nineteenth century, however, is J. C. Bucknill. His two books, "The Medical Knowledge of Shakespeare" (1860) and "The Mad Folk of Shakespeare" (1867),[47] are still looked up to as authoritative works. In the first mentioned book, Bucknill gathers together all the references to the healing art present in each play and discusses them sanely, and more or less, from an historical standpoint. He affirms that Shakespeare had " . . . a mind imbued with medical thought,"[48] but he readily realizes that the times in which Shakespeare lived were markedly conducive to an acquisition of medical lore. Nevertheless, his enthusiasm bubbles over at times. Referring to the speeches in "The Comedy of Errors"[49] on the causation of melancholia by domestic trouble, he says that it "could scarcely be improved upon by the science of the present day," for it presents "a picture of medical etiology drawn with more knowledge than most members even of the profession of medicine could themselves display."[50] Referring to the mustering of the blood to the heart as described by Warwick in relating of the death of the murdered Gloster,[51] he says, "it is perfectly in accordance with modern physiological science . . . in every way remarkable."[48] However, in the final analysis, Bucknill feels " . . . that Shakespeare's theoretical knowledge of medicine closely corresponded to that prevailing at his time among its professors, . . . " He comes to the historical conclusion as follows: "I have arrived at the fullest conviction that the great dramatist had at least been a diligent student of all medical knowledge existing at the time."[52] and that " . . . his mind was deeply imbued with the best medical information of his age,"[52] having " . . . authority even for his trivialities and most glaring absurdities."[54]

Following Bucknill's work, we have that of C. W. Stearn. In his "The Shakespeare Treasury" (1869), he devotes a good deal of space to Shakespeare's medical and psychopathological knowledge, gathering together the numerous references in his plays, under the headings of Anatomy, Physiology, Pathology, Practical Medicine, Medical Jurisprudence, Insanity, Medical Ethics, Hygiene, Dietetics and Materia Medica. Together with most medical men, he is "with reason, astonished at Shakespeare's knowledge of their profession,—a knowledge which it has cost them both time and diligence to acquire."[55] Referring to Shakespeare's knowledge of the physical signs of death and pointing to the death-scene involving Falstaff,[56] Stearn says: "Here Shakespeare, with one penful of ink has given us what amounts to a whole class lecture or a dozen pages of an ordinary medical textbook."[57] It is interesting in this regard to note that Bucknill puts forth the suggestion that Shakespeare might have read Hippocrates, and that from this source he might have obtained a great deal of medical material, particularly in regard to the Falstaff death-scene; for he takes cognizance of the fact that " . . . in a note to the Sydenham Society's edition of Hippocrates, Adams (the editor) remarks: 'Shakespeare's description of the death of Falstaff contains images which have always appeared to me to be borrowed (at second hand no doubt) from this and other passages of the present work'[58] (Hippocrates)." "Of Shakespeare's conception of Sanitary, Dietetic and Hygienic influences," Stearn says that "there is evidence enough to show that, on those matters, *as in all else*, he was far in advance of the age in which he lived."[59] It is obvious here that Stearn has exercised his critical faculties very little. He echoes merely the idolatry of his period, and the quotations that he gives are nothing more than casual allusions to the healing art, that the average layman of the day might certainly have been familiar with.

Another work, published in 1884, is "Shakespeare as a Physician" by J. Portsmouth Chesney. Here again, for the most part, we have a mere cataloguing of medical references under medical headings, together with a great deal of puerile moralizing, but little actual criticism. Chesney is most lavish in the praise of Shakespeare's medical knowledge. He considers that "It is . . . wonderful to note the accuracy of Shakespeare's knowledge even in . . . medical thought . . . "[60] He attests to the "accuracy of Shakespeare's therapeutics."[60] Thus, referring to Shakespeare's descriptions of epilepsy, Chesney says, "These pictures of epilepsy, though terse, are yet very well drawn,—even a medical pen well skilled in portraiture could not do it better. . . . "[61] Referring to Shakespeare's description of the death of John of Gaunt,[62] he says, "Shakespeare . . . has managed the symptomatology of the case with such a masterly skill, that it might puzzle the most astute diagnostician of our time. . . . " Shakespeare's description of syphilis, especially, he considers "a marvel of accuracy."[63] Chesney says, "The ravages made by pock upon the osseous system seem to have been clearly comprehended by Shakespeare."[64] "Ricord, Videlle nor Bumstead [famous syphilographers of Chesney's time] could hardly paint a better penpicture of the ravages of syphilis than did . . . Timon."[65] He finally concludes on this subject: "There cannot be found in the writings of the ablest medical authority of this age, a more terse and truthful picture of syphilis than is seen"[63] in Shakespeare. All this may be very true; but it can readily be seen that Chesney like many others has confused observation and exposition with true medical learning.

Chesney quotes the words of the clown Pompey in "Measure for Measure,"

> Why, very well. I telling you then, if you be remem'red, that such a one and such a one were past cure of the thing you wot of, unless they kept very good diet, as I told you,—[66]

and adds,

> The idea conveyed in the last paragraph, as to the necessity of good diet in the treatment of the "diseases you wot of" was ignored by the medical world until a period so recent as to come within the memory of our junior practitioners; and that its propriety, nay, necessity, should have forced itself upon the notice of a non-medical man three centuries and a half ago when no medical mind had grasped the idea, is only one among the thousand of evidences we have of Shakespeare's unequalled sagacity.[67]

Chesney was evidently unfamiliar with the therapeutics current in Elizabethan England, otherwise he could not possibly have been guilty of such a false statement. The fact is that diet was a well recognized and commonly used method of treating the sick. In the case of syphilis especially, it was "the tub-fast and diet" combination which was in universal use. The references to this in the general literature as well as the medical literature of the day, are very numerous. Bullein's "New Boke of Phisicke" gave as the three best physicians to cure sickness as follows: "The fyrste was called Doctor Diet, the second, Doctor Quiet, the third, Doctor Merryman."[68] This same Bullein gives the following directions as to diet in syphilis:

> Also the sicke body must eate but little meate,
> And that kynde of meate as shall here after be prescribed,
> And at sutch time as shalbe appoynted.[69]

Sir Thomas Elyot's "Castel of Helthe" (1541) has no less than two chapters on diet as a therapeutic measure, one "on the diete of colerike persons and the other "on the diete of fleumatic persons."[70] Even Bacon in his "Essay on the Regimen of Health" does not fail to mention diet, for he says, "I commend rather some diet for certain seasons than frequent use of physic."[71]

But especially in Shakespeare's understanding of the parturient stage in woman does Chesney speak of the "wonderful accuracy of detail in which our author is so fertile . . . [for, continues he] See how he names the leading facts connected with labor."[72] What are these leading facts as pointed out by Chesney? They include nothing more than this: that Shakespeare describes labor as occurring in the night time, and particularly on dismal nights. On such a basis does he conclude that Shakespeare knew the facts of labor!

In a like category with Chesney is B. R. Field. In his book, "Medical Thoughts of Shakespeare" (1885), he asserts that "Shakespeare's . . . mighty mind seems to have teemed with the knowledge of . . . medicine. . . . "[73] Thus he refers to the "accuracy with which Shakespeare has written of apoplexy . . . "[74] and of "how concisely he describes epilepsy."[75] Speaking of sleep, he says, "Shakespeare certainly had the true idea of the great value of sleep, and he also knew of its importance in the treatment of brain diseases."[76] For the most part, Field's work is nothing more than a concordance of medical references.

It is refreshing now, to turn to a few critics who are more rational in their consideration of Shakespeare's medical learning. Such a one is Newton Hawley. Hawley (1892) feels, that in a general way, Shakespeare's "learning is not of the pedantic sort, too common with scholars, but is drawn from the book of nature and does not lead him into serious mistakes."[77] He is against those particularly, who consider that Shakespeare had any real medical knowledge. He grants the fact that "the poet was familiar with the theories of the older medical writers."[78] But as to his actual medical knowledge, he distinctly says, "It has seemed to me that the medical learning of the poet has been rather alleged than proved, . . . and I cannot see . . . any evidence of medical or scientific knowledge that would have been at all astonishing in an intelligent and observing layman."[79] With this Getchel (1907) agrees, for although he does not deny "the wonderful grasp that he [Shakespeare] had of the knowledge of the time . . . " nevertheless, he distinctly states that, primarily, "he was a playwright and not a scientist."[80] Griffiths also is in complete accord with these views. In his article "Shakespeare and the Practice of Medicine"[81] (1921) he lists numerous references to indicate Shakespeare's acquaintance with medical matters, but he does this logically and from the historical viewpoint.

In the same group belongs John Moyes (1896). His "Medicine and Kindred Arts in Shakespeare"[82] attempts to deal with Shakespeare's medical knowledge historically, in its relations to sixteenth century medicine. Under the headings, Physiological and Pathological Notions, Medicine, Materia Medica, Toxicology, Therapeutics, Surgery, and Midwifery, he quotes the passages bearing on the subjects, offering little comment here and there of an historical nature. The general import of the book is that Shakespeare was well acquainted with the medical knowledge current at the time. Such a conclusion is also reached by Laehr (1898): "Überall ergiebt sich also bei genauer Nachforschung, wie sehr sich Shakespeare in den wissenschaftlichen Anschauungen seiner Zeit bewegte, und wie gerade er das für seine zwecke passende heraus zu greifen und zu beleben wesste."[83]

But the most important work along this line has undoubtedly been done by A. W. Meyers (1907). Meyers seems to be the only one of the medical commentators with the true historical viewpoint, and with the adequate scholarship to properly and rationally adjudge the medical material in Shakespeare's plays. In his two articles on the subject he places Shakespeare's medical knowledge and his general attitude toward physicians in the proper historical light, showing that the poet reflected but the life about him. He sounds the key note of the best modern Shakespearean criticism when he says:

> Of some of the characteristics of the Medicine in Shakespeare, . . . the picture we obtain is . . . that which could easily be obtained from the life of that time by a layman of *such extraordinary genius* as Shakespeare's. The wonderfully accurate descriptions of death and old age are eloquent testimonials of his powers of observation, expression and portrayal.[84]

He concludes, "The characteristics of the medicine of Shakespeare are . . . those of the medicine of the best physicians contemporary with him."

Turning now to the circulation of the blood, we find commentators paying especial attention to Shakespeare's understanding of this physiological function. Thus A. O. Kellogg (1859), discussing physiology in general, speaks of the "extraordinary amount of physiological knowledge possessed by Shakespeare,"[85] considering that "a very complete physiological . . . system . . . could be deduced from the writings . . . — a system in complete accordance . . . with that which we now possess as the result of the scientific research and experience of the last two centuries,"[86] including of course, the circulation of the blood; for he later remarks " . . . that many passages from his dramas seem to indicate a pre-existent knowledge of this great physiological fact."[87] Strangely enough, more than seventy-two years later, Harry Epstein, the latest of the medical commentators, in general line with the idolatrous nature of all his comments, agrees with Kellogg in this matter, for in speaking of "the great master's knowledge of the general range of physiology and pathology, as well as of general diseases"[88] he is convinced that the evidence "clearly indicate(s) that the theory of the circulation of the blood was known . . . to Shakespeare . . . ,"[89] definitely stating, "that Shakespeare seems to have had a knowledge of the circulation of the blood."[90]

The strongest proponent of the latter matter, however, is Orville W. Owen. Owen first set out to prove that Bacon was the author of the works attributed to Shakespeare. In common with all those who wish to make the plays teem with knowledge enough to make them worthy of Bacon he envelops Shakespeare in the purple toga of actual medical knowledge and accords to him the credit of discovering the circulation of the blood, in preference to William Harvey. He quotes many lines to prove his contention. Like many Shakespearean fanatics, he does not quote the lines that show the fallacy of his belief. Owen says that Shakespeare "had a very good knowledge of the great discovery"[91] being "perfectly familiar with the experiments and proofs of the circulation of the blood,"[92] and stating further, that " . . . he was either the original discoverer of the great anatomical and physiological truth or knew intimately the experiments and dissections upon which it is based."[92] He concludes that Shakespeare " . . . must either have dissected the human body or at least seen it done"[92]; and further that " . . . if William Shakespeare wrote the plays bearing his name, he discovered the circulation instead of Dr. William Harvey."[92]

With the exception of J. W. Wainwright, who considers that "it is quite certain that Shakespeare anticipated Harvey in a knowledge of the circulation of the blood"[93] and of Kellogg and Epstein already mentioned, there are few critics who agree with Owen. Thus Bucknill (1859) remarks: "the circulation of the blood . . . was not known to Shakespeare,"[94] and again: "There is not . . . in Shakespeare, a trace of any knowledge of the circulation of the blood."[95] Thus too, Gillespie (1875) says, "It is questionable whether Shakespeare was acquainted with the discovery of Harvey about the circulation of the blood."[7] Thus also L. K. Hackman (1888) asserts " . . . that he knew nothing of the circulation of the blood . . . "[20] Likewise, Moyes (1896) contends "that notwithstanding the frequent references in Shakespeare to the circulation of the blood, he had no notion of its course as understood since the discovery of Harvey."[96] While Donnellan (1902), Getchell (1907) and Kahn (1914) come to an historical conclusion on this matter, the first holding that "Regarding the true nature of the circulation of the blood the great dramatist was without accurate knowledge,"[97] the second believing that ". . . his ideas were those current at the time,"[98] and the third saying, "It is doubtlessly true that the great dramatist knew as much as was known in his time about the circulation of the blood . . . (but) was not in advance of his contemporaries in that knowledge."[99] This controversy serves to illustrate how far Shakespearean fanatics can stray from the path of logic and the atmosphere of reason.

But the latest book on the subject, as previously mentioned, is that of Harry Epstein (1932). Epstein seems to have been entirely unaffected by the skepticism that has prevailed in Shakespearean criticism in the last thirty years. The book only serves to illustrate further the uncritical approach and the expository methods of the medical commentators. Dr. Epstein continues along the same beaten paths as his predecessors whom we have already considered, merely listing passages in Shakespeare's works relating to the healing art, and accepting such as *prima facie* evidence of "the bard's great fund of knowledge in this field."[100] He is so "impressed . . . with his [Shakespeare's] deep knowledge of medicine and its collateral sciences,"[100] that he considers such knowledge as most "comprehensive" and "nothing short of amazing." He concludes his book by saying that Shakespeare's medical lore, "considering the period in which he lived, fills us with wonder and admiration for medicine was decidedly disjointed."[101] We shall see later that it was precisely for this very reason that Shakespeare had so much medical knowledge.

Surgery too, Obstetrics, Syphilology, Therapeutics, Materia Medica, Toxicology, all these branches of the healing art are well represented in Shakespeare's plays, all come in for laudatory commendation at the hands of the medical commentators. Thus John Knott remarks that Shakespeare's " . . . knowledge of the principles of surgery and medicine was nowhere behind the professional knowledge of his day."[102] Field says that, "Obstetrics was Shakespeare's favorite branch of the profession."[103] Max Kahn asserts that "Shakespeare everywhere evinces marked knowledge of toxicology"[104] and that "a student of Shakespeare must inevitably become a good syphilographer."[105] Referring to the latter, J. F. Rogers writes that "Shakespeare paints the picture of the victim of venereal disease with no sparing of pigment and with no uncertain sweep of the brush."[12] There are others and others. But all run in the same uncritical vein.

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24. *Ibid.*, p. 104.
25. A few quotations from Shakespeare. *Med. Rec.*, 56: 135, 1905.
26. "It seems that Shakespeare's wonderful mind not only comprehended matters of the past,—imbibed the ideas of his present, but with prophetic grasp anticipated the most important events which were to transpire ages after he ceased to be." Chesney, J. P., Shakespeare as a Physician. Chicago, Chambers, 1884, p. 154.

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28. II Henry IV, iv, 4, 114–116. All quotations from the plays in this paper are based on the Student's Cambridge Edition of Shakespeare's Complete Works, ed. by W. A. Neilson, N. Y., Houghton Mifflin, 1906.
29. Measure For Measure, ii, 4, 24–26.
30. *Op. cit.*,[14] p. 903.
31. Love's Labours Lost, i, 1, 235.
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33. *Op. cit.*, p. 274.
34. Love's Labours Lost, v, 2.
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41. Adams, J. Q., Pre-Shakespearean Dramas. N. Y., 1924, p. 376.
42. "That Shakespeare was aware of the theory of the action of antitoxin is evident. . . . "[26]
43. "Could Shakespeare also have known the theory of gravitation at this early date? . . . it seems that the great poet refers to it in *Troilus and Cressida* (Act. iv, Sc. 11)." Epstein, H. William Shakespeare M.D. Newark, Lasky, 1932, p. 9.

    "The reference is quite sufficient to convince one that Shakespeare had a correct theory of gravitation."[25]
44. "The action of this 'stuff' [some of the medicines prepared by Cornelius for the queen to cause one to appear dead for a time] of Shakespeare is most beautifully typical of chloroform and had we the slightest evidence that a drug of that character had ever existed as such, save in the fertile brain of the greatest writer of the world, we well might doubt the priority of discovery of anaesthesia by both Morton and Wells." Chesney, J. P., Shakespeare as a Physician. Chicago, Chambers, 1884, p. 122. So then Shakespeare might have discovered chloroform and anesthesia:
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speare but his point of view, of course, was not idolatrous.

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50. *Op. cit.*,[48] p. 76.
51. II Henry VI. III, 2, 160–78.
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53. *Op. cit.*,[48] p. 13.
54. *Op. cit.*, p. 14.
55. Shakespeare's Treasury. N. Y., Putnam, 1878, p. 163.
56. Henry V, II, 3.
57. *Op. cit.*,[55] p. 169.
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61. *Op. cit.*, p. 122.
62. *King John*, v, 7, 14–23.
63. *Op. cit.*,[60] p. 172.
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86. *Ibid.*, p. 130. Also in Shakespeare's Delineations, etc. p. 3.
87. *Ibid.*, p. 131. Also in Shakespeare's Delineations, etc., p. 3.
88. William Shakespeare, M.D. Newark, Lasky, 1932, p. 16.
89. *Op. cit.*, p. 9.
90. *Op. cit.*, p. 8.
91. Owen, O. W.[21] p. 109.
92. *Ibid.*, p. 105.
93. Medical and surgical knowledge of Shakespeare. *Med. Rec.*, 56: 135, 1904.
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96. *Op. cit.*, p. 9.
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CONAN DOYLE

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THE late eighties and the early nineties of the last century produced a high level of literary output which for varied excellence is almost unique in our literary history. Robert Louis Stevenson was still writing and new authors (playwrights and novelists) who have now achieved their meed of recognition were coming to the fore: Rudyard Kipling, Bernard Shaw, J. M. Barrie, H. A. Jones, A. W. Pinero, H. G. Wells, Stanley Weyman, Anthony Hope, Hall Caine, Rider Haggard and many others.

In comparison, the plays and fiction of the present day furnish a shadowy contrast to this wealth of imaginative literature.

Into this field of high endeavor stepped the burly form of Conan Doyle to take by right of his imaginative genius a leading place. His name will endure if only because he was the creator of "Sherlock Holmes," albeit, as this article will attempt to show, he has many other claims upon the gratitude of posterity.

First of all he was a doctor, no bad training for a life of letters. There have been many literary physicians from St. Luke, "the beloved physician," down to modern times: Sir Thomas Browne in the seventeenth century; Tobias Smollett and Oliver Goldsmith in the eighteenth century; John Brown, Charles Lever and Samuel Lover in the nineteenth century; Robert Bridges, the late Poet Laureate; Oliver Wendell Holmes and S. Weir Mitchell in the United States; and today Somerset Maugham, H. de Vere Stackpoole, H. H. Bashford, Francis Brett Young and Austin Freeman. These are the names that come to one's mind but there are many more.

Even more closely than the Minister of Religion the doctor is brought into contact with the lives of his fellow mortals and, given the gifts of imagination and composition, his material for a work of fiction is ready to hand.

Like Sir Walter Scott, his literary ancestor, Arthur Conan Doyle was born in Edinburgh. The date was May 22, 1859. He came of an old Anglo-Norman family who had settled in Ireland for many generations. There was a strong artistic strain in his blood, his grandfather being the great caricaturist, John Doyle, who signed his cartoons "H. B.," while one of his uncles was Richard Doyle, the designer of the cover of *Punch*. Charles Doyle, the novelist's father, was a Civil Servant in the Government Office of Works in Edinburgh and eked out his meager salary of £240 per annum by painting pictures and illustrating books. He married Mary Foley, an Irishwoman, in 1855. They had six children, four girls and two boys, of whom Arthur was the elder. It was a hard struggle for the Doyles to bring up this family on so little. Conan Doyle's sympathy and appreciation of the fact that his mother bore the burden of the strain were aroused at an early age. Often he said to her, "When you are old, Mammie, you shall have a velvet dress and gold glasses and sit in comfort by the fire." In later life he proudly added: "Thank

God, it so came to pass." It is the mothers of Great Britain who have helped their sons to achieve greatness. Arthur described his boyhood as Spartan at home and more Spartan still at the Edinburgh Day-school, which he attended from the age of seven to nine, where a one-eyed tawse-brandishing schoolmaster who might have stepped out of the pages of Dickens made their young lives a misery.

Occasionally, distinguished London friends of his artist grandfather came to Edinburgh and visited the Doyles. Conan Doyle was always pleased to recall that he once sat on Thackeray's knee.

At school, young Doyle became a fighter: "Oh, Arthur what a dreadful eye you have got!" cried his mother one day; "You just go across and look at Eddie Tulloch's," retorted the young victor.

The Doyles were Roman Catholics and, after two years at Hodder, the preparatory school, Arthur entered Stonyhurst where he remained until he was sixteen, winding up a successful public school career by taking honors in the London Matriculation Examination. Bernard Partridge of *Punch* and Father Bernard Vaughan were among his school-fellows.

After a year at Feldkirch, which is a Jesuit school in the Vorarlberg province of Austria, to learn German, in October 1876 he entered the University of Edinburgh as a medical student. In a strenuous four year course (as it was then) Conan Doyle worked and played hard. He passed his examinations creditably, he played as a forward in the Edinburgh University Rugby team and he became a first-class amateur boxer. At the same time he earned money for his medical fees by acting as an unqualified assistant to medical practitioners in the vacations. He was very poor in those days but the bent to literature was already with him and, as he tells us in "Through the Magic Door," not infrequently the few coppers allowed for his lunch went in the purchase of some second-hand book such as Gordon's Tacitus, Pope's Homer or Addison's Spectator. As the student daily passed by the twopenny tub filled with tattered books "a combat ever raged betwixt the hunger of a youthful body and that of an inquiring and omnivorous mind." But when the lunch was forgone the volume was treasured all the more for the sacrifice.

It was in these days that he wrote his first short story: "The Mystery of the Sassassa Valley," for which, to his great joy, he received three guineas from *Chambers' Journal*.

Before Conan Doyle qualified, he paid a seven months visit to the Arctic Seas on a Whaler, the *Hope*, in the year 1880. He was rated as ship's surgeon. The voyage enlarged his knowledge of mankind and brought in fifty pounds to the family exchequer. At the end of 1881 he took his degree as Bachelor of Medicine and Master of Surgery at Edinburgh. He now had a profession which for the next ten years of his life he sedulously practiced and was eventually to abandon except for a brief return during the South African War. For the moment, some reference must be made to his professional career. There seems little doubt that if opportunity had served, Conan Doyle might have been a great physician or surgeon. He had a sound knowledge of his profession; he was endowed with sympathy and imagination; but the narrow circumstances of home-life prevented him from taking those unpaid hospital appointments which are the stepping-stones to the higher walks of medicine. His father's health had failed and it was incumbent upon him to earn money as the sole mainstay of the family. So first of all he went as ship's surgeon on a voyage to West Africa and then, unfortunately, joined in practice at Plymouth in 1882 an eccentric fellow-student whom he calls "Cullingworth." The whole story of this man's extraordinary methods of practice and of his heartless betrayal of Conan Doyle can be read in Doyle's book "The Stark Munro Letters." The association culminated in Doyle leaving Plymouth and in putting up his plate as a medical practitioner in Portsmouth.

In the intervals of waiting for patients Dr. Doyle wrote some fifty or sixty stories for many of the best magazines. He did not contribute much to medical literature, but he took his M.D. degree at Edinburgh and he wrote a paper on "The Gouty Diathesis." He married Miss Hawkins in 1885. His first novel, "The Firm of Girdlestone," a sensational romance, was already written and after wandering from publisher to publisher lay neglected in a drawer.

Now came the beginnings of success, at first unrecognizable. When a student, Conan Doyle had been greatly struck by the gifts of Joseph Bell, Surgeon to the Edinburgh Infirmary, not only for diagnosis but also for detecting occupation and character. Mr. Bell inspired the creation of Sherlock Holmes aided not a little by M. Dupin, Edgar Allen Poe's scientific detective. Sherlock Holmes made his bow to the world in "A Study in Scarlet." Refused by several publishers it was eventually sold outright for £25.

But Conan Doyle's real ambition was to be an historical novelist. In 1889 "Micah Clarke," a story of the Monmouth Rebellion, was published by Longmans on the favorable report of their reader Andrew Lang. It was followed by "The Sign of Four," another Sherlock Holmes story, and this in turn by "The White Company," a study of Edward III's reign.

In 1890 Doyle was at the parting of the ways. His literary success was growing; his medical practice was stationary. On returning from a visit to Berlin where he had been to see Koch's work on tuberculin, he met Sir Malcolm Morris, the dermatologist, who urged him to seek a wider field for his activities. After some months of study at Paris and Vienna (in the latter city he wrote "The Doings of Raffles Haw") he left Portsmouth and set up in Wimpole Street as an eye-specialist. Three months sufficed for this experiment for at the end of that time the memorable "Adventures of Sherlock Holmes" were appearing in *The Strand Magazine*. The first came out in July, 1891; the last in 1927. The fifty-six stories in broken series covered a period of thirty-six years and, as the author wrote, "those who first read of Sherlock Holmes as young men have lived to see their grown-up children following the same adventures in the same magazine." Although, as I have hinted, the character of Sherlock Holmes has some hereditary features, in his presentation by Conan Doyle he was original and unique. He has become a classic more real to us than many a living acquaintance and this verisimilitude is shared by his brother-in-arms, Dr. Watson, whom we love for his very obtuseness. In proof of this there is the story of the char-a-banc full of French schoolboys who desired to see first of all in London the Baker Street rooms of Sherlock Holmes.

Sherlock Holmes was a great achievement, a landmark in literature, yet strange to say it was belittled to me in a conversation I once had with his creator. He said he felt that detective fiction was on a lower literary plane and that these stories had overshadowed much of his better work as a military historian and as an historical novelist. It may be so, but the fact remains that in the detective story Conan Doyle stands supreme in spite of a countless host of imitators. At intervals Doyle strove to escape from his Frankenstein. He killed Sherlock Holmes at the falls of Reichenbach and the public never ceased to clamor until he came to life again. So in the end Doyle compromised. He wrote novels that pleased him, like "The Refugees," a story of the epoch of Louis XIV, and of the French in Canada, and "Sir Nigel," in which the characters of "The White Company" reappear, and from time to time rewarded his less instructed readers with an adventure of Sherlock Holmes. As one who must be numbered with them, I well remember with what eagerness we rushed to purchase the new number of *The Strand Magazine* in which the promised story was to appear. There can have been nothing like it since "Pickwick" came out in monthly parts. Later on came the book in which Sherlock Holmes appears at his supreme height, "The Hound of the Baskervilles."

With literary success established and a sound financial position, Conan Doyle once more distinguished himself in the world of sport. He played Association football up to the age of forty-four and first-class cricket, chiefly for the M.C.C., up to the age of fifty. His skill at billiards was great and he got into the third round of the amateur championship. Golf, tennis, cycling and motoring also shared his affections and he introduced skiing into Switzerland. He was a fair shot and an early advocate of miniature rifle-ranges. He used his knowledge of boxing to good effect in "Rodney Stone."

Conan Doyle not only wrote about adventures, but whenever possible he sought for them. In 1896, he was a war correspondent in Egypt and saw something of Kitchener's early frontier warfare in the desert. He utilized his Egyptian experiences in "The Tragedy of the Korosko," which relates the adventures of a party of tourists captured by the dervishes.

At the age of forty, foiled in his hopes of securing a commission in the Imperial Yeomanry, he went out to the South African War as Senior Physician of the Langman Field Hospital and fought enteric fever with the same zest with which he faced the bowling on a tricky wicket. His book, "The Great Boer War," is the most readable history of that long drawn-out campaign and ran into some sixteen editions. On his return to England he wrote a pamphlet entitled "The Cause and Conduct of the War in South Africa" which did much to stem the tide of vilification of Great Britain on the Continent. This had an enormous sale both in this country and abroad.

Conan Doyle twice stood for Parliament. In 1900 he contested Central Edinburgh as a Liberal Unionist and in 1905 Hawick Burghs as a Tariff reformer. Both seats were Radical strongholds and, in spite of a gallant fight in which Doyle won on each occasion the respect of both friends and opponents, he was unsuccessful. In the end he realized that he could do more useful public work out of Parliament, unfettered by allegiance to a political party.

The work that he did in this direction was enormous. Not only his pen but his money and personal energies were always at the service of noble causes. He was the great knight-errant of modern times, his lance ever in rest against injustice and wilful ignorance. But for his unceasing advocacy the wrong done in the conviction of a harmless solicitor named Edalji would never have been righted and Oscar Slater would still be stigmatized as a murderer for a crime which he never committed.

Doyle's great short story, "Danger," together with an article in *The Fortnightly Review*, written eighteen months before the outbreak of the war, directed public attention to the submarine menace and re-read in the light of later experience are little less than prophetic. His book "The Crime of the Congo" helped to put an end to the Congo atrocities. These are striking examples out of many others which testify to Conan Doyle's patriotism and public spirit. They are facets of his many-sided character which have been imperfectly appreciated.

In 1902 he received the honor of Knighthood and was appointed Deputy Lieutenant of Surrey. The University of Edinburgh gave him the honorary degree of L.L.D.

Sir Arthur's first wife had died in 1906 and towards the end of the year 1907 he married Miss Jean Leckie. The marriage proved an ideal one, "an Indian summer deepening to a golden autumn," as he poetically described it. From the outset, Lady Doyle identified herself with her husband's work and was a true helpmeet in his manifold activities.

Crowborough, Sussex, was Sir Arthur's address, but despite continued literary activities he was frequently away from home generously fulfilling the many claims which were made upon his time. In 1914 he visited the United States and Canada.

The Great War came and added to the burden of his work. In his village in Sussex he formed the first Volunteer Force and served in the ranks as a private. He surveyed the French and Italian Fronts at the invitation of the Government and his interesting reports on these visits and on different aspects of the war did much to hearten the public in those difficult anxious days. Conan Doyle also wrote a history of the war in several volumes which, I fear, has failed to receive the appreciation which it deserves. He, himself, did not escape unscathed, for his eldest son who had been badly wounded on the Somme died of pneumonia in the hour of victory, as did also his beloved brother, General Innes Doyle, who had been the companion of his early struggles at Portsmouth.

By now, Sir Arthur was sixty years of age. He could look back on a life rich with the fruition of his genius and industry, and full of both public and private service to mankind. He loved his home life. None could have blamed him for withdrawing from the dust and conflict of the public arena. But in the evening of his days the veteran knight-errant felt the call to a new Crusade. The Faith in which he had been brought up gave place at first to scientific agnosticism and this in turn to a deeply religious outlook on life after thirty years' study of psychical phenomena. Whatever one's creed or prejudices, nobody who heard Sir Arthur lecture or speak on spiritual matters could doubt his fervent belief in the gospel that he preached. His earnest convictions and the faith that burned within him led him to travel all over the world and to endure much physical discomfort, mental strain, abuse and controversy. In the end, he gave his life for the work to which he had felt himself dedicated. He died of heart disease on July 7, 1930, at three score years and ten, worn out by his latter days of endeavor. "The world is upheld by the veracity of good men: they make the earth wholesome. They who lived with them found life glad and nutritious." I never met Conan Doyle without realizing the meaning of this saying of Emerson. Life was all the better for seeing him. The sterling worth of the man appeared in every word that he spoke and in many an unrecorded act of kindness and goodwill. You can mark the same spirit in his writings. Each one of them is clean and wholesome.

He was a versatile writer and achieved success in many fields of literature in addition to the Sherlock Holmes stories. All his historical novels are good. A student of the Napoleonic Age, he delighted us with the exploits and adventures of "Brigadier Gerard" and with the little cameo of the Emperor in "Uncle Bernac." His medical stories like those in "Round the Red Lamp" are the best medical stories ever written, for actual experience as well as genius went to the making of them. In "The Lost World" and "The Poison Belt" he competed with Jules Verne and H. G. Wells on their own ground and not unsuccessfully. Professor Challenger is a vivid personality. "A Duet with an Occasional Chorus" is an amusing excursion into the domestic novel and he was an inimitable writer of short stories. He wrote his autobiography, which he entitled "Memories and Adventures," in 1924, and many books and papers on his psychical investigations.

Conan Doyle is eminently readable. He has no tricks of style and writes in lucid straightforward English. He wrote quickly, and his work sometimes suffered from the speed. We remain puzzled as to whether Watson's practice was in Kensington or Paddington and as to whether he was wounded in the arm or the leg. These are minor inaccuracies and detract little from the vivid presentation of the story.

He wrote one great dramatic sketch "A Story of Waterloo," in which Henry Irving played the star part of Corporal Gregory Brewster. Many of his books were turned into successful plays and films.

He was pre-eminently the novelist of romance and adventure and his books are a priceless heritage to a jaded world. Besides all this, his life was a great romance. He knew poverty and affluence, lack of recognition and world-wide fame. He spent his great gifts freely and often over-generously for the public weal. He was a prophet, a preacher, a novelist, a soldier, a physician and an athlete. But I like best to think of him as one of the most noble and righteous of men whom it has been my good fortune to meet in this vale of tears.

SAMUEL JACKSON*

By WILLIAM S. MIDDLETON, M.D.

MADISON, WIS.

THROUGH the ages medical education has advanced by irregular, uncertain steps rather than by any sustained movement. Its component teaching units have experienced similar, if not simultaneous, seasons of ebb and flow. Singularly, forceful personalities have more clearly influenced such fluctuations in an institution's history than have its physical equipment, past and prospect. Certainly this circumstance is a heartening commentary upon the basic individualism of medicine.

From its foundation in 1765 Pennsylvania dominated the field of medical education in North America, until an unwelcome offspring in the form of Jefferson Medical College began educational operations at its very doorstep in 1825. The consternation excited by the dynamic McClellan may well be pictured when the recent losses to the faculty of Pennsylvania are recalled to mind. Benjamin Rush had died in 1813. His successor, Benjamin Smith Barton, in turn had given but two courses of lectures when he died in December, 1815. Nathaniel Chapman had followed Barton as professor of the institutes and practice of medicine in 1816. John Syng Dorsey had taken the chair of anatomy upon the death of Caspar Wistar, in 1818. Stricken on the evening of his Introductory Lecture Dorsey's untimely demise had laid the scene for the Machiavellian maneuver which transferred Philip Syng Physick to the chair of anatomy and made way for the call of William Gibson from Maryland to the professorship of surgery in Pennsylvania. The processes of stabilization were apparent in the relative youth of the newer faculty, with the exception of Physick, and in the appointment of John Redman Coxe, Robert Hare and William Edmond Horner to the chairs of materia medica, chemistry and anatomy (adjunct), respectively.

By the time another decade had elapsed, Physick had retired and in his stead Horner had been named; Hugh L. Hodge had succeeded William P. Dewees as the professor of obstetrics; the chair of materia medica had been declared vacant by the Board of Trustees and George B. Wood elected to fill it. Finally Samuel Jackson had been advanced from the rank of a lecturer to the professorship of the institutes of medicine. Of this timber was made the famous faculty of 1835 in the University of Pennsylvania Medical School and its completion initiated one of the most fruitful periods of its illustrious career.

In every productive phase of an institution's history some individual has served as a catalyst to leaven the mass. In casting about for such a force in the faculty of 1835 the morbidly introverted Horner, the skeptical Hodge, the methodical Wood, the brilliant Hare and the clever Gibson may be eliminated from further consideration. Interestingly either of the two remaining members of this faculty, Nathaniel Chapman or Samuel Jackson, might well fulfill all of its requirements. Chapman was endowed with great personal charm and force. Gracious and self-possessed, his command over his students was but a reflection of his wider influence over the medical profession of the country at large. In the retrospect of a century much of the impelling force of his attractive personality is lost in a knowledge of his petty manipulations; but it is freely admitted that Chapman was unquestionably the most dominant figure of American medicine of his period. One of his redeeming characteristics was his appreciation of the qualifications of his associates. Among these preeminently stood Samuel Jackson and it was with a thought of advancing his claims as the chief energizing force in Philadelphia medicine a century ago that this study was undertaken.

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* Read before the University of Wisconsin Medical History Seminar.

A clue directing attention to Samuel Jackson in this relation is found in Joseph Carson's commemorative discourse:

> When Dr. Jackson became a visiting physician of the Almshouse, auscultation was in its infancy, and it became his duty, as well as a pleasure, from the extreme interest he took in it, to test its value and develop its practical usefulness. With the younger men who were associated with him in charge of the sick wards, he studied diligently the cases under treatment, applied the method of diagnosis that he had introduced among them, and where death occurred verified the results of their previous estimates of disease by pathological examination. He was a student as well as teacher among students.

Truly an interesting picture of an infectious enthusiasm!

Samuel Jackson was born March 22, 1787 in Philadelphia. A peculiar interest and pride in the Medical School of the University of Pennsylvania may have arisen from the circumstance of his father David's graduation from the College of Philadelphia in 1768 with the first class receiving the degree of Bachelor of Medicine. David Jackson later became a trustee of the College. Samuel's mother was Susan, the daughter of Jacob Kemper who had emigrated from Germany to New Jersey. From her, Samuel inherited a keen intellect and engaging qualities in conversation.

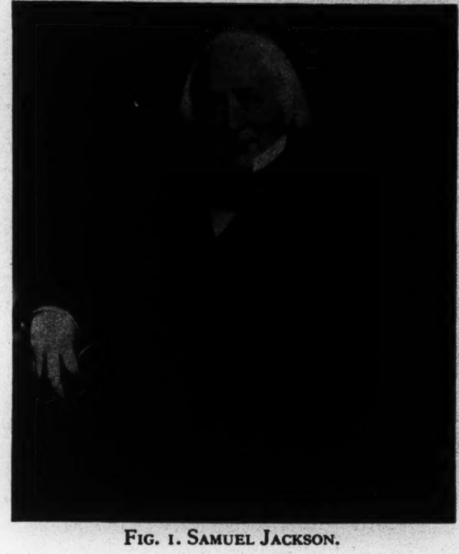

FIG. 1. SAMUEL JACKSON.

Little record is found of Samuel Jackson's early education. He is known to have attended classical courses in the University of Pennsylvania, but no degree was won from its collegiate department. Thereafter he became the house-pupil of James Hutchinson, Jr. who died shortly. Whereupon Jackson entered the office of Caspar Wistar. This relation was a very happy one, if the following dedication of the former's inaugural thesis be taken as a brief:

> [To] a man, whose amiable qualities have endeared him to a large circle of

admiring friends; a physician whose talents have gained him the confidence and respect of a community, this ephemeral production is inscribed, as a small tribute of respect for every virtue which adorns and exalts the human character, and as a mark of heartfelt gratitude, for many instances of almost parental kindness, experienced while under his tutelage, by his affectionate pupil, Samuel Jackson.

The inaugural thesis upon suspended animation that this dedication prefaced, was offered in fulfillment of the requirements for graduation from Pennsylvania in 1808. The young essayist evinced a thorough familiarity with authority and sources; but especial interest attaches to his recourse to the experimental method, even though isolated experiments were performed upon only eight cats. The young student observed the influence of oxygen atmospheres upon the dying heart of drowned cats and concluded from the prolongation of cardiac activity thereby that oxygen and excitability were related if not one and the same thing. In analyzing the various theories of excitability Jackson characterized the doctrine of Brown as a "travesty with a chemical garb." In a further relation he diplomatically referred by contrast to "the wild and daring genius of Brown" and "the more correct and discerning Rush." His viewpoint and conclusions were the reflection of the accepted theories of respiration of the day; but his meager experimental observations deserve preservation.

A rather unpromising prospect awaited Jackson upon his graduation from the Medical School. The death of his father (1801) had placed the burden of the conduct of the pharmacy upon his eldest son. A year after Samuel's graduation from Pennsylvania this brother in turn died and the former was left with this business heavily encumbered with debts. Temperamentally ill-fitted for such a burden he nevertheless undertook it as a matter of family honor. Upon the outbreak of hostilities with Great Britain in 1812 he joined the First Troop of City Cavalry and served in their maneuvers to protect Philadelphia during the autumn and early winter of 1814. The First Troop was stationed at Mount Bull, Maryland to observe the movements of the British in Chesapeake Bay. During this period Jackson served as a vidette between the post in Maryland and Philadelphia. When peace was declared in 1815, he sold the pharmacal business and assumed full responsibility for the long-standing indebtedness. It is said that he was only able to discharge this obligation after many years.

In the very fitness of things it seems proper that Samuel Jackson should have lent his time and energies to the establishment of the Philadelphia College of Pharmacy in 1821. In his capacity as professor of materia medica he was well qualified to link the two closely related professions. His introductory lecture upon the "Conditions of Medicine in the United States" outlined the pressing need of the regulated pharmacy. He did not spare the medical profession.

> The great body of practitioners, especially those residing in the country, knowing medicines only by their names, have been ignorant of the very different qualities subsisting among them. In their purchase, incapable of making a selection as to quality, the lowest price was preferred. Inferior, deteriorated, and sophisticated medicines and drugs met

with ready sale, while the choicest and most select, because of higher price, could very seldom meet with a purchaser.

Gerard Troost as professor of chemistry completed the first faculty of the Philadelphia College of Pharmacy. He was succeeded in 1822 by George B. Wood who was to be associated with Samuel Jackson for twenty-five years in the Medical School. To Jackson and Wood the Philadelphia College of Pharmacy owed its prompt recognition and from this initial impetus, maintained growth. Samuel Jackson resigned this post May 24, 1827 and was succeeded by Benjamin Ellis. Jackson's interest in pharmacy and therapeutics was manifest throughout his career, not only in his teaching but also in his continued contributions of formulae to pharmacal journals. In 1828 he lent his pen to a vigorous condemnation of Swaim's panacea, a proprietary mercurial preparation, which was being widely exploited.

Coincident with his service at the College of Pharmacy Jackson joined Nathaniel Chapman in the instruction of medical students during the long interval between the winter sessions. Organized in 1817 by Chapman and William E. Horner this group later included Dewees, Bell, Mitchell, Harris and Hodge and as the Medical Institute came to rival the Medical School in popularity and influence. In 1829 a new hall housed classes of over one hundred students and in 1837 a charter was granted. Whatever their inherent faults the existence of such institutions was invited by the short and inadequate courses of the recognized medical schools. Here Jackson first gave courses in medical chemistry. Later he taught materia medica and therapeutics. His connection with the Medical Institute was terminated in 1844 upon a change in its organization.

In October, 1826 the Trustees of the University authorized Chapman to select an assistant for the conduct of the course in the institutes of medicine and his nominee, Samuel Jackson, received the unanimous support of the faculty. A casual reference to a serious illness after this appointment is made by Jackson, but no details of the same are available. His title was assistant to the professor of the institutes and practice of medicine and clinical medicine. The institutes of medicine had first been taught in Philadelphia by Caspar Wistar. Thereafter Benjamin Rush had given the course until upon Adam Kuhn's resignation he undertook the teaching of both the institutes and the practice of medicine. Eventually Rush found clinical medicine crowded out of the picture and over two-thirds of the course was devoted to the institutes and little more than a month to practice in all of its ramifications. Chapman attempted to include the institutes with practice but soon completely superseded the work in the institutes by the subject more important in his opinion, the practice of medicine. At that time (1827) Jackson planned to include in the institutes of medicine, physiology, pathology, therapeutics, symptomatology, semeiosis, diagnosis, prognosis and hygiene. In his introductory lecture he expressed a doubt as to the possibility of covering more than the first three subjects—a large contract by modern standards.

The proposition which Jackson expressed in this address a century ago, sounds strangely familiar:

> For a moment let us endeavour to conceive what vast results would flow, if

the enormous sums annually expended by the nations of the world in the prosecution of wars, the maintenance of armies and fleets, the erection and support of fortresses, and all the other means and appliances of destructive warfare, were appropriated to the cultivation of mind, the improvement of knowledge, the general diffusion of superior education, to the moral advancement of man.

At this time Jackson likewise expounded the thesis of the superior claims of theory as a basis for medical advance. In placing sharp strictures upon the value of experience in medicine, he nevertheless clearly appreciated its relationship to theory:

> Experience is the quality of an individual. He may improve by it, and be led to contribute to the progress of knowledge. It may enable him to observe better, to think better, to theorise better; it may impart a tact in the detection, discrimination and treatment of diseases, but which cannot be imparted to another. It dies with himself. Experience partakes of the character of the individual and deserves confidence only as he is intelligent, well informed, free from credulity and prejudices, with a well balanced mind, capable of clear conceptions, logical arrangements, and unembarrassed deductions, the fruits of an exercised judgment. Without these requisites, experience is a base and counterfeit coin, of no value, and which receives currency only from ignorance and imposition. How little of the vaunted experience of those, who have consigned it in the fasti of the science, has stood the test of time and the advancement of information.
>
> Experience and theory are, by nature, intimately united: Let none put them asunder. Experience combined with sound discriminating observation, furnishes the facts from which theory is derived, while the truth of a theory can be alone determined by experience and observation. The union of the two is of mutual advantage; they sustain and strengthen each other; they afford a mutual protection against the numerous errors to which each is separately exposed, and in their combined operation, are most efficient in forwarding the true interests and progress of science. Disunited, they soon fall into excesses and degenerate in character: the one becomes a prey to baseless speculation; the other sinks into a dull, unenlightened routine; neither of the slightest advantage to medicine, but rather embarrassing and retarding its advance.

Nor was Jackson loath to attack the reigning order in medical education:

> The important object in education, should be to avert this unhappy state of intellectual nullity—to form the habit of investigation, to conduct the mind to the comparison of things, estimating their similitudes and differences, arranging them in their respective and appropriate classes, and expressing them in precise formulae. A just education is much less the communication of knowledge—by examination and reflection—experience and induction. Whoever is desirous of mastering the difficulties of a science, must rely chiefly on his own instruction—dependence on others, will ever throw him into a sciolism, always inefficient, often contemptible. He must labor in his own vineyard, who would be rewarded with abundant harvests, and would gather the choicest fruits.

Not content with this indirect attack upon the stultifying state of medical thought and training he continued:

> Dismiss, then, gentlemen, from you, undue reverence for mere authority. Let it not take deep root in your minds, or they will be incapable of admitting new truths, conflicting with adopted opinions. Scepticism is no crime in medicine. We admit no oracle but nature. Whatever doctrine you find in books or

hear in lectures, subject it to the ordeal of observation, experiment and reason. If it cannot be referred to some established principle, should you not dismiss it as unsound; at least hold it in doubt for subsequent consideration.

Such sentiments are remarkable in several relations. First, the period was conspicuous for its conservatism. In the second place the address was delivered before students in the University of Pennsylvania where respect for authority was traditional. Lastly they represent the expression of a newly appointed subordinate to the untouchable professor of the practice of medicine. Perhaps Jackson's bold analysis of the situation in medical education which was warmly received by the student body, was too patently true to draw official rebuke. In any event it marked him as the most progressive and foresighted of the medical faculty—a position that an earlier publication (1826) had indicated:

Anatomy, physiology, pathology, and therapeutics, constitute, in fact, a single department, of which they are subdivisions. They have a correlative affinity so intimate, that a knowledge of the one is indispensable to understand the others. The attempt to advance them singly, has been productive of confusion and error, which must be perpetuated by a persistance [*sic*] in this course. A general harmony must, therefore, prevail in the principles of the different branches of medical science. A principle, for instance, that is established in physiology, cannot conflict with a principle or a fact in pathology, or therapeutics; and, whatever is true in one of these, must, in the others, be found to possess an application. If the reverse of this prevails, it is an evidence of error; the principle is false, the fact misunderstood, or the application made of them is incorrect.

Medicine, under the influence of this doctrine, acquires a truly philosophical character; is assimilated to the demonstrative and natural sciences, in which a few principles explain a great variety of phenomena.

The strength of Samuel Jackson as a teacher did not rest upon his subscription to any fixed philosophy nor was it dependent upon any trick of pedagogy. His student and biographer Joseph Carson wrote:

The teaching of Dr. Jackson possessed great attractiveness, not only from its warmth and enthusiasm, but from the freshness and novelty of his prelections and his practical expositions. He exhibited in animated language the ideal entertained by him of the true nature of pharmacological investigation, and placed its proper objects before the mind of the attentive student.

To his students was always offered an insight into the historical background of medicine and its influence upon the progress of practice. In tracing the development of medicine, he said:

Cabalism, theosophy, magic and astrology, furnished the basis on which it was erected. Escaping from these absurdities, it sought refuge in, and looked for assistance from the visionary speculations of the alchemists. It then became a department of physics and mechanics—was next allied to the wildest metaphysics, and connected with the rudest chemistry. It has been alternately a doctrine of humoralism, solidism, vitalism, and always more or less deeply imbued with dogmatism and empiricism.

Jackson's own philosophy was primarily the outgrowth of Brunonianism as modified by Rush. Nor was he a passive disciple of this school, since his public differences with Daniel

Drake upon this subject enlivened the medical meetings during the latter's short stay in Philadelphia. However no mind as receptive as Jackson's could long remain unresponsive to the thought of the new French school. Bichat opened the field of morbid anatomy to him. At this time Broussais was in the ascendancy in clinical medicine in Paris and Jackson was attracted by his theory of excitation and excitability as a natural offshoot of his Brunonian leaning. Later occasion will be taken to touch upon this theory of disease; but in the present relation it is interesting to observe the stages by which Jackson deserted its tenets. Many of his students had been stimulated by his teaching to seek wider training in the newer methods of clinical medicine at the fountain head in Paris. The most prominent among these, William Wood Gerhard, was outspoken in his unfavorable reaction to Broussais:

> Broussais is the best known, his reputation is universal, and the benefits he has conferred on medicine are immense, but unfortunately he is a wretched lecturer. His own opinions are given in the most awkward, clumsy manner; the manner and style of lecturing are coarse and vulgar.

From the same sources came glowing reports of the methodical and painstaking Louis to whose clinics were flocking students from all over the world. Jackson was not slow in establishing the value of Louis' methods for himself and a note of disapprobation of his earlier guide was thus struck; "The system of Broussais contains many and important truths, but it is not all true, nor does it compass all truth. It is enforced by its author in too dogmatical a spirit." As late as 1850, as disclosed in the notes of F. W. Sargent, one of his students, Jackson still defended Brown, Rush and Broussais, stating that diseases change in form, grade, intensity and response to therapy. "But when a new cycle dawned, a new condition was present, demanding new principles and modified practice." More significant than any lingering allegiance to a fallen system of medicine was the amazing pilgrimage of Pennsylvania graduates to Paris to learn at first hand the newer methods. Osler in an admittedly incomplete list numbered some fifteen men who left Philadelphia between the years 1830 and 1840 to spend varying periods under the French masters. Among those who returned to their native city to make conspicuous places in medicine may be named William W. Gerhard, George W. Norris, Caspar W. Pennock, Alfred Stillé, Thomas D. Mutter, Meredith Clymer and William Pepper.

In 1822 Samuel Jackson was appointed physician to the Philadelphia Almshouse. This appointment opened a boundless field for clinical study and instruction supported by the unexcelled opportunity for the bedside-necropsy correlation of disease manifestations. As noted previously Jackson immediately availed himself of every facility in establishing the utility of the new physical method of auscultation. Samuel G. Morton is the authority for the following episode: A policeman suffered from a wasting disease and a skeptical confrère called upon Jackson to demonstrate the nature and the extent of the presupposed pulmonary lesion. The latter carefully applied the newer methods of physical diagnosis and outlined an extensive cavity in the lung. The complete confirmation of his physical findings on necropsy lent a marked impetus to the interest in auscultation. Upon the reorganization of the Board of Physicians and Surgeons of the Almshouse (1822) Jackson was made one of the clinical lecturers. These demonstrations were held Wednesdays and Saturdays and by common consent "their popularity in no small measure arose from the devoted earnestness and lucid expositions of Dr. Jackson." His clinical experience at the Almshouse was reflected in his publications and in his textbook. His long service in this relation was carried across the Schuylkill to the new Blockley of 1833–34 and was finally terminated in the disgraceful defection of the resident physicians in the episode of the cockroach. On behalf of the attending staff Samuel Jackson acted as their advocate. His efforts were futile and the abolition of the visiting staff closed the doors of Blockley to clinical teaching for nine years. Jackson never resumed his instruction within its walls.

In the light of subsequent developments and particularly by reason of Gerhard's epochal contribution to the differentiation of typhus and typhoid fever, an earlier study of Jackson takes unusual significance. Lewis P. Bush is authority for the statement that with Jason Valentine O'Brien Lawrance, Jackson had in 1824 reported the occurrence of intestinal ulceration in a group of patients from along the Schuylkill dying of an obscure febrile disorder. The reference is not available and the workers failed to correlate the clinical and the pathological pictures. In his clinical lectures Jackson remarked the notable increase in diarrheal conditions in Philadelphia upon the pollution of its Schuylkill water supply.

Relatively early in his teaching career (1832) Jackson published his textbook, "The Principles of Medicine founded on the Structure and Functions of the Animal Organism." His mental reservation relative to its reception was reflected thus, "A work of this kind, it is by no means improbable, may not prove popular." Displaying a comprehensive grasp of the basic medical sciences he attempted to assimilate them and to adapt them to the study of medicine. The keynote was the physiologic approach to practice and organic medicine was decried as "the contemplation of death." Certainly the following passage would find general subscription in modern medicine:

> The alterations of structure it reveals are effects; they have been preceded by an antecedent cause, which is essentially the disease. Organic alteration of structure being once accomplished our means of restoration to the natural state are feeble, limited, and not often successful. The physician must anticipate this event, and to do so with certitude and effect, he must be able to penetrate to a knowledge of this cause, to expose the nature of its action, and determine the characteristic features of this phenomenon, which is entirely physiological. Organic medicine conducts to this knowledge; it must precede and prepare for the reception of physiological medicine.

In spite of Jackson's avowed repugnance to "the slavish obedience to authority" this textbook serves as an excellent guide to the status of physiological and medical information of its period. Source references are numerous and intelligently applied. Bloodletting was still in its heyday and it is interesting to find such statements as the following from Jackson:

> From the quantity and tenacity of the size, and the degree of contraction of the clot, the intensity of the inflammatory action is commonly inferred. Whenever the coagulum is dense and firmly contracted, and more particularly when it is rounded like a cup and floating in the serum, with a tough layer of size occupying the upper surface, the indication of the most acute inflammation is generally supposed to be announced, and reiterated blood-letting to be demanded.
>
> The contrary state, when the coagulum is loose and flabby, does not separate from the serum, and is destitute of a sizy coat; or should one exist, being of a soft gelatinous consistency, and having a greenish hue, is regarded as indicative of an inflammatory grade that will not bear general depletion, or the system tolerate the lancet.

The laws of irritability received disproportionate space and consideration at his hands. A few quotations taken at random from the text may serve to elucidate his viewpoint:

> Irritability, is a common property of all organized matter, and, is a first result of the vital chemistry or affinity, by which matter is brought into, and maintained in an organized state. It is a property of the solids alone. . . .
>
> Irritability has its source in the system. It is constantly fluctuating being greater or less in degree, either in the whole organism or in certain organs. It is dependent for its production on activity, the quantity and state of the fluids, and the facility of their circulation. . . .
>
> In the development or exercise of irritability, the state of the fluids manifest a marked influence. Black blood passing into an organ soon determines a suspension of its irritability and consequently of its vitality. . . . This cessation of the action of the heart, does not result, as is satisfactorily shown by Bichat, from a defect in the stimulation of black blood in the cavities of the left side of the heart, but from penetrating into its substance, by the coronary arteries, and the consequently diminished susceptibility to receive impressions, or to respond to the stimulus of its natural energizer, the blood. . . .
>
> The facility of the circulation of the fluids, is connected with the manifestations of irritability. . . . Increase of circulation afflux of arterial or oxygenated blood, and increase of irritability are closely concatenated, they cannot be separated; and it is difficult to assign a precedence to either, in the sequence they observe. . . .
>
> The irritability being increased in one, two, or three (it very rarely is in four) organs or tissues, it is correspondingly diminished in all the other organs and tissues.

Jackson apparently credited the superstition of the poisonous qualities of human saliva during anger. He likewise subscribed to the phrenological system of Gall and Spurzheim, stating that "it may be susceptible of improvements and of additions, but its fundamental propositions are founded in nature." On the basis of the following passage Carson claimed priority for Jackson over Marshall Hall in the description of reflex action:

> An irritation or stimulation, the excitation of the organic actions, awakens the activity of the transmitting faculty of the nervous tissue and is conveyed and repeated in the nervous centres, disturbing their mode of existence, consequently through them is reflected into other organs or tissues with which these centres are in communication.

Placing a high value upon the information gathered from the study of the pulse, Jackson disagreed with Rush's opinion as to the limits of its utility. His therapeutic observations were frequently sound, even in the light of modern knowledge.

> Artificial excitement of the bowels by purgatives, especially of the more active purgatives, should be cautiously avoided. They become accustomed to that mode of stimulation, and will not act in a natural manner. The evil, like that of intemperance in the use of ardent liquors, perpetuates itself. . . .
>
> What Sydenham said of Opium may be applied to this (water), better abandon the profession than relinquish it.

The clinical discussions are scarcely less interesting. One of these is especially illuminating and denotes acute powers of observation.

> Chronic inflammation of the pericardium, and, of the heart, and organic disorder of this organ, prohibit sound sleep, and cause dreams of great horror. The patient is denied the refreshment and invigoration of repose. He is incessantly oppressed with terrific ideas of death by suffocation in some form, and starts erect, or leaps from the bed in agony and alarm.

With the advantage of a century's retrospect the judgment grows that the textbook owed its short life to Jackson's adherence to the supremacy of principles or theories, as expressed in his Introductory Essay on Vital Force, prefacing Morris' translation of Lehmann's Chemical Physiology (1856), "The Unknowable is not acknowledged, and any hypothesis is preferred to a concession of mystery."

In this relation Jackson's paper on epilepsy carries the Hippocratic stamp:

> If direct deductions from the symptoms, which are but derangements of function, will lead to a knowledge of the organ affected in any disease, and the nature of the organic lesion, we must conclude that the brain is, undubitably, the seat of epilepsy, and sanguine congestion suddenly and periodically induced the character of the morbid lesion. The fact is demonstrated, 1st. By the symptoms of epilepsy being produced by irritating directly the brain, and by mechanical compression exercised in it. 2nd. By dissection after death, which, with scarcely an exception, exhibits more or less of a morbid condition of the brain or its meninges.

Ever interested in matters relating to public health Jackson was a conspicuous figure in two major epidemics in Philadelphia. On March 20, 1820 he was elected president of the Board of Health and in this relation his tremendous energy and executive capacity were taxed to the limit by an epidemic of yellow fever in the same year. Fortunately its morbidity and mortality tolls, 125 and 83 respectively, did not approach the horrors of 1793; but the generation that had experienced the earlier pestilence still lived to reflect its terror in the consternation of natives and neighbors. Jackson allied himself with the adherents of the theory of the local origin of the disease.

Aside from the carefully analytic review of the epidemic's course Jackson's account is especially interesting from an historical standpoint in its sweeping indictment of New Yorkers in general and David Hosack in particular for their reprehensible activities during Philadelphia's season of distress. Of course, commercial intercourse with Philadelphia was forbidden by the health authorities of New York. The press of the latter city published grossly exaggerated stories of the former's plight. Obviously these newspapers assumed that the Board of Health of Philadelphia had suppressed the facts relative to the extent and the severity of the epidemic for ulterior motives, whereas judging from the mortality statistics the actual conditions at the time were probably more serious in New York than in Philadelphia. To make matters worse the resident physician of the Port of New York "evinced an alacrity of disposition and a pruriency of ambition to keep pace with his great newspaper rival and compeer, in spreading and maintaining the unfounded reports and exaggerated alarm." Particularly did Jackson resent the imputation of a virtually criminal responsibility for the transportation of a drunken victim of the yellow fever from Philadelphia to New York.

The differences with Hosack were of another order. Jackson charged Hosack with an unwarranted personal attack and proceeded to administer a public rebuke which for virulency is without parallel in the former's publications. Hosack had unfortunately concluded that yellow fever was a contagious disease. His personal observations on the subject were faulty and his quotations of authority inaccurate. Through these loops Jackson directed his barbed shafts.

> His extensive reading and deep research are advantageously exhibited by this intimate acquaintance with authors, who, to the reproach of the profession, duly threaten to become the obsolete and dusty lumber of deserted libraries. . . . A confusion of intellect is sometimes induced by the multiplicity of ideas, and the memory becomes loaded with such a medley garniture of facts and opinions, that nothing is perceived clearly and distinctly.

Ruthlessly following his opening, Jackson continued:

> Errors, that in men of less notoriety, and on subjects less in vogue than yellow fever, are venial and innocent from the obscurity that surrounds them, in the distinguished and far-famed Professor swell into fictitious authority, and ripen into dogmas diffusive of many mischievous consequences. It then becomes the concern of humanity and correct philosophy, that they should be detected and exposed.

Certainly the provocation must have been great for Jackson to have discarded his accustomed reserve so completely.

In ascribing a local origin for the yellow fever Jackson particularly indicted Pegg's Run, an open sewer that drained the refuse of glue factories, tanneries, privies and slaughter houses through a populous section of the city to the Delaware River. Since it obeyed the same laws as fevers arising from marsh miasmata, "yellow fever must be considered as belonging to that class of diseases produced by marsh miasmatic poisons." Interestingly Jackson likened the pathologic findings in yellow fever to those of arsenical poisoning.

> These effects bear a strong similarity to the different classes of yellow or malignant fever, the poison producing which, like arsenic, acts chiefly on the stomach, and produces a lesion of that viscus in proportion to the quantity introduced into the system.

Referring to the results of therapy as outlined by such famous predecessors as Rush and Chisholm, he wrote, "Never was disappointment more complete, or professional pride more humbled."

The appearance of cholera in 1832 led the Board of Health to appeal to the Philadelphia Medical Society. A committee composed of Bond, Condie, Emerson, Hays, Horner, Huston and Jackson was thereupon appointed in April to investigate the matter. Their report was widely circularized. On June 22, 1832 the Sanitary Board of the Councils delegated Richard Harlan, Charles D. Meigs and Samuel Jackson to study the situation in Montreal or Quebec or in both of these cities. The committee went to Montreal and by the time their plans of procedure had been formulated for coping with the anticipated problem in Philadelphia, the disease made its appearance in New York.

With their plan in view each member of the Commission with adequate volunteers was assigned to a temporary hospital for the care of these cases as they should appear in Philadelphia. Jackson's experiences as Physician-in-Chief to Cholera Hospital No. 5 are preserved in a General Case Book in the College of Physicians of Philadelphia. Unfortunately it is little more than a register, although there are brief clinical notes upon sixty-nine patients of whom twenty-one died. Frequent reference was made to the intemperate habits of the victims. In one instance this note was made, "Was exposed to Sun on Schuylkill, sent to Bushhill hospital, afterwards got into Moyamessing." The last named was a penal institution. The stages of the disease were classed as incipient, forming, reforming and relapsing collapse. Elsewhere Jackson published his experiences in two excellent clinical papers. His gratuitous services were acknowledged by a silver pitcher given by the Board of Health as a token of appreciation.

Jackson's conduct in these two major epidemics won the widespread respect of the laity as well as the profession. Of him it was said, "To be calm, collected, fearless and efficient in affording aid and assistance to fellow mortals under such circumstances is godlike." As a medical student he had pronounced his credo and his life was true to the pattern: "To diminish this accession to disease, and to guard these avenues of death, that man may live nature's originally allotted span, is the object of medical science, the constant, the unvarying effort of every philanthropick physician."

Jackson was a member of the College of Physicians of Philadelphia and of the American Philosophical Society. In 1836 he was made a corresponding member of the Academie Royale de Médecine. In one of his later communications Jackson referred to a conference with Sir Benjamin Brodie in London. Whether or not he had made other European pilgrimages must remain uncertain. The latter half of his life was not blessed by robust health. In spite of a troublesome neurologic affection which eventually led to an ataxia, he remained in harness. In 1863 he relinquished his chair at the University after an occupancy of twenty-eight years. In all, his connection with the Medical School had covered thirty-six fruitful years. His last medical contribution was published in 1870. He died on April 4, 1872, at eighty-five years of age. To the memory of Samuel Jackson no finer tribute can be paid than to repeat that of his biographer Joseph Carson, "He was a student as well as teacher among students."

Acknowledgment is gratefully made for the photograph of Samuel Jackson furnished through the courtesy of Drs. Frederick D. Weidman and William Pepper.

DEPRESSED FRACTURE AND TREPHINING OF THE SKULL BY THE INCAS OF PERU*

By JUDSON DALAND, M.D.

PHILADELPHIA

THE Megalithic Incas, according to Moodie, were supposed to have lived around Lake Titicaca, 1300 B.C. But little is known of their history, nor that of the Incas, because the method of recording was by knotted cords, in a certain order, and of different sizes, colors and lengths, called a quipu, which cannot be interpreted by anyone now living.

Nothing is known of the origin of the Incas, who believed in a supreme being named Pachacamac, were Sun-worshipers, established a form of socialism under a beneficent monarch, developed agriculture, built terraces in the mountains to increase the area of arable land, irrigated the land, the water being conducted from distances as great as 40 to 60 miles, and also built magnificent stone buildings, forts and walls.

The first King of the Incas, Manco-Capac, whose reign began in the eleventh century, established Cuzco, the City of the Sun.

The Incan Empire spread from the capital city, Cuzco, to Quito and beyond, and a road was constructed through the Andes, from Cuzco to Quito, a distance of about 1500 miles. The Empire extended north beyond Quito, Ecuador, and south along the Andes, and west to the Coast, through what is now known as Peru and Chile, and also partially controlled the tribes of the Amazon Valley.

Incan civilization was far advanced, and surgeons reduced luxations, employed fixation, massage, venesection, and understood the art of mummification.

The following is a description of a skull in the possession of the author, which is from a mummy, discovered in a Husca or grave near Nazca, which is some distance from Lima. The grave contained the vestments, ornaments, trinkets, and gold face mask, usually found when an Incan prince or ruler is buried, and may be 2000 years old.

This well-preserved, brachycephalic skull is from a man, aged about forty years.

The sutures and teeth indicate maturity. About one-half of the crowns of four upper molars have disappeared, probably due to masticating coarse food; the surfaces are oblique, and extend downward and inward.

The sockets in the superior maxilla, from which the teeth have disappeared, appear normal, and there is no evidence of disease or infection. The palatine arch is rather high, and the nasal septum is slightly displaced to the left. The left supraorbital ridge shows two openings for the supraorbital nerve, which communicates by a common opening with the orbital cavity. The zygoma and malar bones are normal and well developed.

Dr. Milton J. Greenman, to whom the author is indebted for the skillful removal of the calvarium, states that the primitive three divisions of the malar bone, usually found in the Chinese, is also found in the prehistoric Peruvians, and so far as he knows, nowhere else in North, Central or South America.

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* Read before the Section on the History of Medicine of the College of Physicians of Philadelphia.

Dr. Willis F. Manges states that the *x*-ray shows that the left sphenoidal fissures were normal, and the right abnormal, possibly due to a new growth and pressure. The frontal sinuses were absent, and the mastoid cells poorly developed. The skull bones are thicker than normal. The mid-sagittal occipital region was slightly depressed and comparatively thin, due to a fracture that had healed.

The cranium is smaller, and the capacity less than the Caucasian. According to Gray's Anatomy, the average cranial capacity of the white male adult is 1460 c.c., and according to Squiers, the average cranial capacity of the Incas is 1230 c.c. The capacity of this skull is only 1210 c.c.

The author has no explanation for the rather deep, ovoidal depression, measuring about 1 by 3 inches, and corresponding in location to the attachment of the nuchal ligament.

There is an irregularly rounded, shallow depression, measuring about 1 by 2 inches, located over the middle and posterior third of the sagittal suture, which is smooth and ankylosed, both externally and internally. These abnormalities are probably due to a slightly depressed fracture, secondary to a blow from a war club, that healed spontaneously.

This skull also shows a smooth, round, shallow, saucer-like depression, located in the anterior portion of the left frontal bone, measuring 1¼ inches, and extends to the right, almost to the median line, and the lower edge is 1½ inches above the supraorbital ridge. Below and to the right of the center of this depression, there is an opening about the size and shape of a small grain of rice.

FIG. 1. SHAMAN TREPHINING SKULL WITH FLINT KNIFE. (FROM MOODY. COURTESY, UNIVERSITY OF ILLINOIS PRESS.)

On the intracranial surface of this region, there is an irregularly rounded, flattened elevation of bone, measuring about 1 × 1 inch, the center is elevated about ¼ inch, and then gradually flattens in all directions, to normal. On the median side of this elevation is an irregular shallow cleft, above which is a thin, vertical line; further to the left is a small opening, corresponding to the one already described. To the left of this opening is an irregular, thin rectangle of bone, measuring about ½ by ¼ inch, having the appearance of a healed, displaced fragment of the inner table of the skull. These appearances are consistent with the supposition that fragments of bone have spontaneously healed and coalesced.

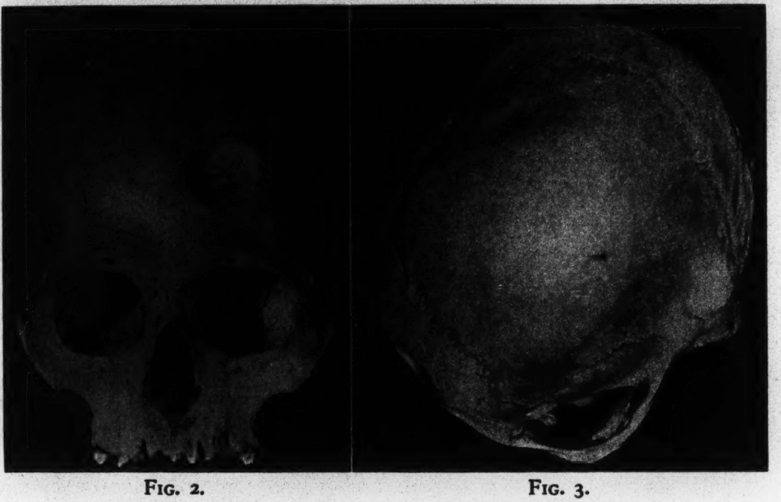

FIG. 2. FIG. 3.

FIG. 2. HEALED DEPRESSED COMMINUTED FRACTURE OF FRONTAL BONE.
FIG. 3. HEALED DEPRESSED FRACTURE IN OCCIPITAL REGION.

This entire area was originally the site of a depressed, comminuted fracture, that healed spontaneously in the course of months or years. This fracture could have been produced by one prong of a stellate copper war club, like the one illustrated.

In the beginning, the author agreed with the general opinion that this skull was an example of healing after trephining, but after the removal of the calvarium, and further study, it was evident that the depressed, comminuted fracture had healed without operation.

Trephining of the skull is the oldest known operation, and has existed from the unwritten past to the present, from savages to civilization, and methods and motives varied widely with cultural progress.

Moodie believes that trephining of the skull was performed 25,000 years ago, and in Europe and Bohemia, 10,000 years ago, but finds no evidence of this operation among the Hindus, Chinese, Egyptians, early Greeks, or Romans. The mortality was probably 50 to 75 per cent.

Trephining of the skull was known to Hippocrates, and was practiced by the Arabs, Persians, Greeks, Romans, Early Christians, Europeans, and in Great Britain, Scandinavia, Japan, Poland, Daghistan, Algiers, Canary Islands, Loyalty Islands, Melanesia, and by North and Central American Indians, and was more frequently performed by the Incas of the highlands of Peru than elsewhere in the world.

The operation was described by Albucasis, an Arabic surgeon, who died in 1013 A.D., by Roger, 1170 A.D., and Bruno and Theodoric in the thirteenth century, and is performed today by the Aymaras of the highlands of Peru and Bolivia.

Dr. Francis R. Packard reports that one of his surgical friends recently witnessed an operation for trephining, for fracture of the skull, by a medicine man in the Atlas Mountains, in Algiers. A rusty iron trephine was heated red hot, a button of bone, with the hair and scalp, was removed without an anesthetic, the opening in the skull filled with sand, an unclean dressing applied, and the patient recovered. Only thirty minutes is required to trephine the head of a cadaver, with an obsidian or flint knife, used as a saw.

FIG. 4. INCA SURGICAL BANDAGE AFTER TREPHINING SKULL.

There is but little direct evidence as to the instruments used in primitive trephining in Peru. The author believes that sharpened flint or obsidian, in the form of a spear-head, arrow-head, or knife or flake, was used for sawing through the skull, and a knife of hardened copper for cutting the scalp. Trephining was also performed by scraping and by cauterization, and rarely by boring holes around the area of skull to be removed.

The Loyalty Islanders trephined by scraping with obsidian, shell or a shark's tooth, and later by broken glass, and the Kabyles of Algiers, by boring a series of holes, afterwards removing the bone by a saw and elevator.

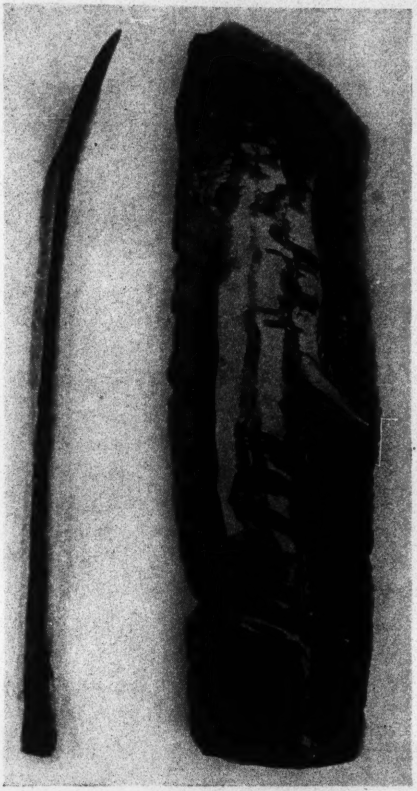

FIG. 5. OBSIDIAN KNIFE OR SAW. NATURAL SIZE.

Primarily, trephining was done for religious, superstitious, magical and mystic reasons. The rondelle, or button of bone obtained from trephining, post mortem, or from enemies killed in battle, was often used as an amulet or charm. Later, trephining was also performed for convulsions, epilepsy and insanity, in the belief that the opening in the skull allowed demon spirits or vapors to escape, and still later for trauma of the skull, severe and persistent headache, disease of the bones of the skull, brain tumor, or frontal sinusitis, complicated by retention of secretions due to obstruction.

Trephining for thaumaturgic reasons was universal, from the remote past to the beginning of the Christian Era, and still continues among a few primitive people, such as the Aymaras in Peru and Bolivia.

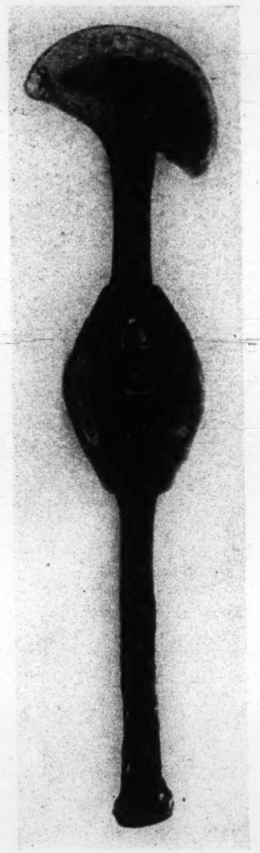

Fig. 6. Inca Copper Surgical Knife.

More than 2000 years ago, diseases such as epilepsy and insanity were additional reasons for trephining.

Knowledge that this operation was beneficial for trauma of the skull, received in combat or by accident, was slowly acquired, through succeeding centuries.

Trephining of the skull is not performed today in civilized countries, for thaumaturgic reasons, nor for idiopathic epilepsy or insanity.

The Incas trephined skulls, at first as a religious rite, later for the escape of demon spirits that they believed caused severe headache, vertigo, convulsions, epilepsy and insanity, and later, for trauma and disease of the skull. The meninges and brain were frequently injured, and according to Muniz, the mortality was about 50 per cent.

There is no evidence that bone, removed by trephining, was used as a charm or amulet, and this custom would be repugnant to the Incas, who reverenced the dead.

Trephined skulls of Incas are widely distributed geographically, and have been found in the neighborhood of Cuzco, the Province of Hurarochin, in Central Peru near Tarma; and in the ruins of Pachacamac, about 15 miles south of Lima, near the Coast, and also in the ruins at Chan Chan.

The date of the beginning of trephining by the Incas is unknown, and according to Freeman, was performed upon 5 to 6 per cent of the population of Peru and Bolivia. The mortality was high, as the surgeons were unskilled in diagnosis and surgical procedures, and possessed no suitable instruments.

Julio C. Tello, Director of the Archaeological Museum at Lima, a pure-blooded Indian of unusual intelligence, and a graduate of Harvard, believes that the instrument employed in trephining may have been an obsidian or flint knife, used as a saw, which was blunt-pointed, thickening rapidly upward from the edge, and the sides rough. The author's observations are in harmony with this view.

The edges of the trephined bone were often beveled inward from above downward, as would be expected if an obsidian or flint knife was used as a saw. The fragments of bone were removed by an elevator, which was probably the end of a knife, a bone or a horn.

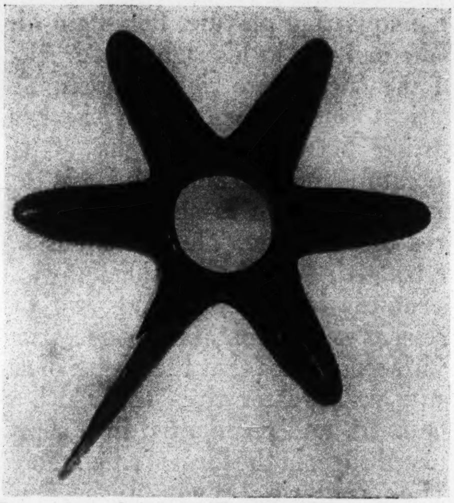

FIG. 7. INCA STELLATE WAR CLUB HEAD MADE OF HARDENED COPPER.

Examination of many Inca skulls in the large collection in the University of Pennsylvania, and the Wistar Institute of Anatomy and especially the trephined skulls in the Archaeological Museum in Lima, showed many single, a few double, and there are records of five trephinings. The trephined openings vary in size, averaging about 1½ by 2 inches, and are square, circular, polygonal or oblong. Some of the trephined skulls showed lines on the surface, at the angles of the opening, due to over-riding of the flint or obsidian saw. Certain of the skulls showed linear scars, supposed to have been caused by the obsidian saw, used in making an exploratory operation, which may have been due to an axe made of hardened copper.

With but few exceptions, trephined skulls showed no evidence of repair, indicating that death occurred soon after the operation, and it is more than probable that early death was often caused by the primary injury.

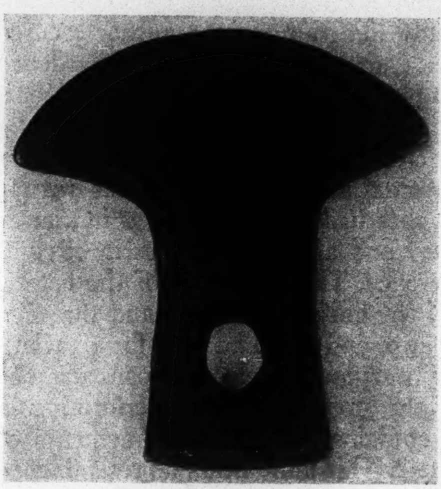

FIG. 8. COPPER INCA AX.

In the Muniz collection of nineteen trephined skulls, six were operated upon for wounds; thirteen, with nineteen operations, revealed no trauma of the skull; and fourteen showed serious injuries that received no surgical treatment.

To the six skulls operated upon for wounds, may be added an unknown number from the thirteen showing no trauma nor radiating fracture of the skull, which may have been caused by a depressed fracture, from which the fragments were removed by the operator, and the remainder may have been operated upon for disease, more especially those showing multiple operations.

Simultaneous multiple trephining may have been due to multiple trauma, and successive multiple trephining may have been due to failure to secure relief from epilepsy, convulsions, severe persistent headache, etc. In some of the fourteen skulls showing serious injuries that received no surgical treatment, the injury may have been fatal, and therefore inoperable.

The knife used by the Incan surgeons for incising soft parts was probably like the one the author secured in Quito, and is made of hardened copper. It has a moon-shaped cutting edge, and the length is 5½ inches. The center of the handle is ovoidal and hollow, and measures 1½ inches in length, 1½ inches in diameter, and about 3⅛ inches in circumference. The distal end of the handle of the knife is widened, and the edge sharp, and could be used for a variety of purposes, such as separating the scalp preparatory to performing a trephining or elevating fragments of bone. This knife bears no resemblance to any modern instrument, and possesses the advantage of helping the operator to hold it with great firmness, and to exercise as little or as much pressure as may be desired. The end of the index finger rests easily upon the upper back surface, and along the shaft of the knife, and control is increased and regulated by the pressure of the thumb and middle finger. The distal end of the knife rests in the palm of the hand.

A partially mummified adult male trephined skull, from Lomas, Peru, a coast town in the south, collected by Hrdlicka in 1913, showed a surgical dressing in situ. The dressing was made of a roll of finely woven white cotton cloth, about an inch in diameter, the mesh fairly small, and only slightly blood-stained. It was a good absorbent, comparing favorably with modern surgical gauze. The dressing was held in place by several strands of strong cords, made from the wool of the llama, dark brown in color, and in places black. A similar cord was used in making the quipu, or knot record.

The frontispiece of R. L. Moodie's Paleopathology (Fig. 1) shows a Shaman or medicine man, trephining the skull. He is sitting on the ground, in a squatting posture, holding a flint flake or knife in his right hand. Most of the Incas were right-handed. The patient is recumbent, with the head resting between the thighs of the operator, and steadied by his left hand. The scalp is shaved over the area of operation. The patient is unrestrained, and the physiognomy and decubitus indicate suffering and distress, as well as voluntary cooperation.

Macedo states that the length of the knife was greater than the width of the head, and terminated in a sharp, curved edge, in the form of a half moon.

For centuries, many Incas have been in the habit of chewing coca-leaf with lime, and knowing its local and constitutional anesthetic effects, may have utilized it prior to trephining, with or without chicka, the native alcoholic drink. The chewed cud of coca-leaves, placed in a wound, relieves pain.

According to Dr. Joseph Rosin, the Cuzco variety of coca-leaves was used by the Incas, and contains 0.5 to 0.75 per cent of cocaine, and the Truxillo variety contains 0.75 to 1 per cent, half of which is cocaine, and the remainder ecgonine, which may be hydrolized into cocaine by lime and saliva. In 1905, Peru exported 1300 tons of coca-leaves, and 6.8 tons of cocaine.

The highland Inca was courageous in battle, and a few skulls show several scars and healed fractures in various regions, or multiple trephining operations.

The Incas had frequent battles, and many were hard-fought, hand-to-hand contests. Their weapons were clubs, made from extremely hard wood; in the ends and sides, splints of copper or stone were inserted; stellate war club heads, made of stone or hardened copper, alloyed with gold and silver, and fastened to poles 5 or more feet in length; hatchets and axes of stone or copper of diverse forms; a tumi or knife, the blade, straight or crescentic, with a short central shaft; spikes; stone slings; and bows and arrows, the heads of which were made of stone or metal.

The author secured in Quito, a stellate copper war club head, made of hardened copper, showing six projections, arranged around the circular opening for the pole. Each projection is blunt, slightly conical, and measures 1 inch in diameter, 1¼ inches in length, and about ¾ inch in width at the base. One of the projections is replaced by an axe, with a cutting edge of 4 inches, an unusual variation. The width of this club head, from the tip of one projection to the tip of its opposite, is 4 inches.

When an enemy is struck by this club head, the impact could be made by one, or by two of the projections, and if by two, and the blow had sufficient force, it might fracture the skull over an area of 2 or more inches. Usually but one of the projections comes in contact with the skull, and if the blow is severe, may cause a small, round, comminuted, depressed fracture, the prong of the club head penetrating about ¾ of an inch, and prevented from going deeper by the two lateral projections.

Many skulls have been trephined for depressed fractures caused by stellate, stone or metal war clubs. Small stones thrown with great force by a sling or a metal or stone arrowhead may produce similar fractures.

Squiers states that the Chimus used bronze arrow-heads, that made a square hole in the skull, and describes one skull with the arrow-head in situ. Larger stones and clubs may cause widespread fractures, with radiating cracks, with or without depression.

The author also secured in Quito, a war-axe, made of alloyed copper, hardened by cold hammering, with a cutting edge of about 7 inches, and a surgical knife.

At the request of Mr. A. C. Dinkey, the Research Department of the Midvale Steel Co., of Philadelphia, made the following report:—"The axe was made of soft, pure copper, of a hardness by Rockwell's B. Scale of −23. The hardness of the thin edge is probably greater. Its chemical composition was:

	Per Cent
Cu	99.375
Sn	.019
Sb	nil
Pb	.016
Bi	.012
Cd	nil
As	.008
Fe	.496
Al	nil
Zn	.060
S	.004
	99.990

Gold and silver may have been used as alloys."

The stellate war club had the hardness of cold worked copper, or mild steel, and the Rockwell B. Scale $-{}^{58}/_{61}$. How this hardness was obtained is unknown, but may have been due to an alloy, rather than cold hammering alone. The surgical knife, made of copper, is probably harder than the war club, and was produced by cold working or alloying.

The following table is for comparison of hardness:

Annealed copper	Less than 0
Soft copper	$1^{3}/_{18}$
Wrought ingot iron 0.04%	50
Cold hammered copper	56
Cold drawn brass	77

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WILLIAM COWARD, M.D., AND HIS WORKS

ESPECIALLY "OPHTHALMIATRIA, LONDON, 1706"*

By BURTON CHANCE, M.D.

PHILADELPHIA

IN the year 1694 there arrived in London, William Coward, M.D., whose career occupies an unique place in the history of literature, philosophy and of medicine, in England. Coward had been in practice for a few years in Northampton, but, because of some objectionable behavior of his (an indiscreet love affair) he found it wise to remove to London, where he settled in Lombard Street, and a few months later, July 5, 1695, he was admitted a "candidate" of the College of Physicians; but, thereafter his life was devoted more to literature and to metaphysical pursuits than to medicine.

Coward was born in Winchester, 1656 or 1657, and was educated at Winchester College. (From the records of the Wykeham Scholars, Mr. James, himself a Wykehamite, is inclined to believe that Coward's birth was in 1658.) He was the son of William Coward, of unrecorded lineage; his mother was the daughter of an apothecary in that city and the sister of Dr. John Lamphire, an eminent physician, and Camden Professor of History, of Oxford. In 1674, then in his eighteenth year, Coward went up to Oxford, remaining there in various grades for several years; first at Hart Hall, then at Wadham College, and finally in a Fellowship, at Merton College, "manifesting great brilliance of intellect," as well as being recorded a "good scholar and traveller"; and during his course taking all the academic degrees. Having determined to apply himself to the practice of medicine, he afterwards prosecuted studies in that line, taking the degree of Bachelor in 1685, and, in July 1687, receiving that of Doctor of Physick.

Soon after coming to London, Coward attracted great attention through the criticism of a philosophical work of his entitled "Second Thoughts Concerning the Human Soul," in which, with great learning and metaphysical knowledge, he united sentiments which were repugnant to the opinions of the best divines. In defense of this, he published another entitled "The Grand Essay," which not only drew attacks from several writers, but complaint was made to the House of Commons, which powerful body of legislators undertook to investigate the complaint.

So unusual were the proceedings, and strange to us, in this day of literary freedom, that I would quote from the records of the investigation:

> March 17, 1704, "Books censured by the Commons,"—Reported from Committee, appointed to examine two Books; "Second Thoughts"; the other, "Grand Essay," and, to collect thereout such Parts as are offensive; and to examine, who is the author, printer, and publisher thereof; that they had examined the same accordingly and had collected out of the said Books several passages therein, which they conceive offensive; and that

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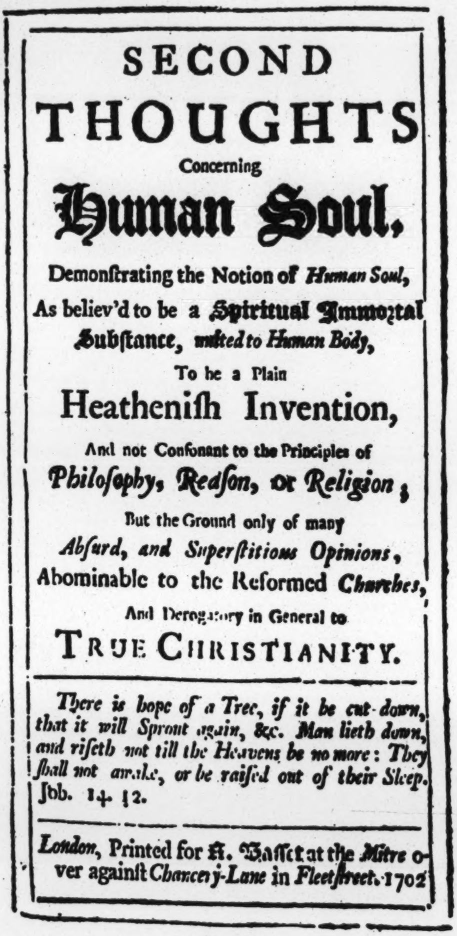
* Read before the Section on Medical History, College of Physicians, Philadelphia, December 11, 1933.

they found that Dr. William Coward was the author of the said books. Report read by the Clerk.



SECOND
THOUGHTS
Concerning
Human Soul,
Demonſtrating the Notion of *Human Soul*,
As believ'd to be a Spiritual Immortal
Subſtance, *united to Human Body*,
To be a Plain
Heatheniſh Invention,
And not Conſonant to the Principles of
Philoſophy, Reaſon, or *Religion*;
But the Ground only of many
Abſurd, and Superſtitious Opinions,
Abominable to the Reformed *Churches*,
And Derogatory in General to
TRUE CHRISTIANITY.

There is hope of a Tree, if it be cut-down, that it will Sprout again, &c. Man lieth down, and riſeth not till the Heavens be no more: They ſhall not awake, or be raiſed out of their Sleep. Job. 14. 12.

London, Printed for R. Baſſet at the *Mitre* over againſt *Chancery-Lane* in *Fleetſtreet*. 1702

FIG. 1.

Dr. Coward, being called in, said, that he hath not read "Second Thoughts" since printed, so that he knows not, whether it is printed according to his copy; that he never intended anything against religion; and that there is nothing contained in these books, contrary either to morality or religion. That he does not deny himself to be the author of these books; and that, if there be anything therein, against religion, or morality, he is heartily sorry, and is ready to recant the same.

Of "Second Thoughts" Coward stated "that 500 copies had been printed to be sold for him at 3/6 a copy: that 300 had been sold at 3 pence a book for selling."

Resolved: That the said Books do contain therein diverse doctrines and positions, contrary to the doctrines of the Church of England, and tending to the subversion of the Christian religion.

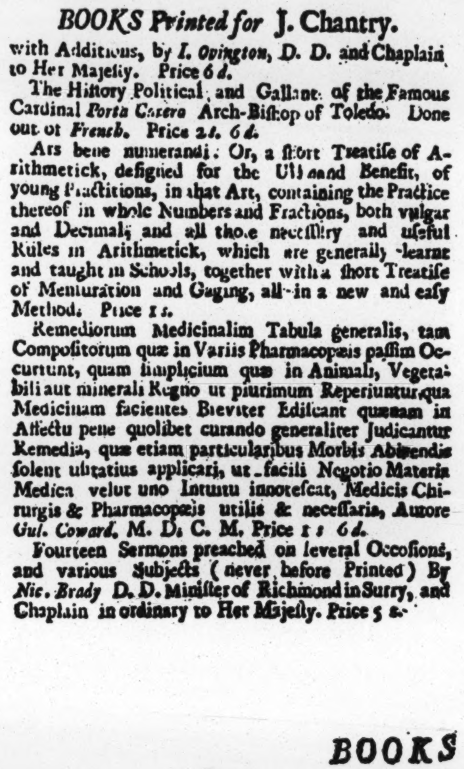
In "Second Thoughts," thirteen and in "The Grand Essay" three passages were found objectionable.

Ordered: That the said Books be burnt by the common hangman tomorrow morning in New Palace Yard, Westminister, and that the sheriffs of London and Middlesex do assist the serjeant-at-arms attending this house in seeing the same done.

The title page of one of the objectionable books is here given, photographed from a copy which escaped the burning and now undisturbedly slumbers at the Ridgway Branch of the Philadelphia Library.

These proceedings increased the notoriety of Coward's books, naturally; and, in the same year, he gave to the world a new edition of his "Second Thoughts."

Before he came up to London he had published numerous translations of Greek and Latin poems, and certain from English into Latin, notably, in 1682, Dryden's "Absolom and Achitophel," an allegorical poem, as a political and controversial satire on the ambitious designs of the Protestant leaders, Monmouth and Shaftesbury, against King Charles II, in his desire to have the Duke of York, a Roman Catholic, become his successor. In this literary effort, Coward was far outstripped by the youthful Francis Atterbury, who, also, at the early age of twenty, published a Latin version of this poem, in which "His taste was distinguished by the happiest junction of freedom and fidelity, being received with the highest praise," and "was extolled more than that of Coward." Moreover, it is believed that Coward had been "schooled" for the poem in College, and because of this it was not accepted by the University, but was published later for him by a friend under his assumed name of "Walter Curle."



BOOKS Printed for J. Chantry.

with Additions, by *I. Ovington*, D. D. and Chaplain to Her Majeſty. Price 6 *d.*

The Hiſtory Political and Gallant of the Famous Cardinal *Porta Carero* Arch-Biſhop of Toledo. Done out of *French.* Price 2 *s.* 6 *d.*

Ars bene numerandi: Or, a ſhort Treatiſe of Arithmetick, deſigned for the Uſe and Benefit, of young Practitions, in that Art, containing the Practice thereof in whole Numbers and Fractions, both vulgar and Decimal; and all thoſe neceſſary and uſeful Rules in Arithmetick, which are generally learnt and taught in Schools, together with a ſhort Treatiſe of Menſuration and Gaging, all in a new and eaſy Method. Price 1 *s.*

Remediorum Medicinalim Tabula generalis, tam Compoſitorum quæ in Variis Pharmacopæis paſſim Occurrunt, quam ſimplicium quæ in Animali, Vegetabili aut minerali Regno ut plurimum Reperiuntur, qua Medicinam facientes Breviter Ediſcant quænam in Affectu pene quolibet curando generaliter Judicantur Remedia, quæ etiam particularibus Morbis Abigendis ſolent uſitatius applicari, ut facili Negotio Materia Medica velut uno Intuitu innoteſcat, Medicis Chirurgis & Pharmacopœis utilis & neceſſaria, Autore *Gul. Coward*, M. D. C. M. Price 1 *s* 6 *d.*

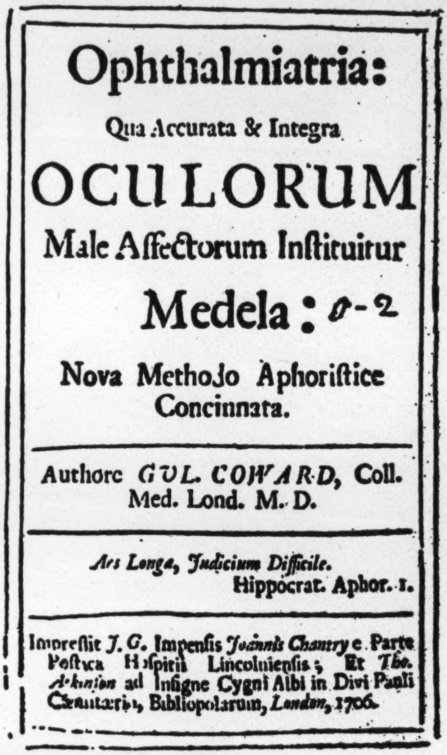
Fourteen Sermons preached on ſeveral Occaſions, and various Subjects (never before Printed) By *Nic. Brady* D. D. Miniſter of Richmond in Surry, and Chaplain in ordinary to Her Majeſty. Price 5 *s.*

BOOKS

FIG. 2.

In 1698, he published in London, "Pecuniae obediunt Omnia, Money masters all things, or satyrical poems showing the power and influence of money over all men. . . . To which are added a Lenten Litany by William Coward."

In 1706 appeared, anonymously, "Abramideis: or the Faithful *Patriarch* Exemplify'd in the Lives of Abraham, Isaac, Jacob and Joseph, An Heroic *Poem.*" In high flown phrases, bordering on the burlesque, he sought to vindicate his regard for the Scriptures and defend himself from the unjust charges as an enemy of Revelation; without, however, altering his heretical opinions. This singularly curious work, consisting of five books, is dedicated to Lord Hallifax. It is a metrical version of some of the remarkable events in the life of the Patriarch. (The poem was evidently unfinished, as it ends with the marriage of Jacob and Rachel.) A copy, beautifully printed, reposes in the Philadelphia Library.



Ophthalmiatria:
Qua Accurata & Integra
OCULORUM
Male Affectorum Inſtituitur
Medela: 0-2
Nova Methodo Aphoriſtice
Concinnata.

Authore *GUL. COWARD*, Coll.
Med. Lond. M. D.

Ars Longa, Judicium Difficile.
Hippocrat. Aphor. 1.

Impreſſit *J. G.* Impenſis *Joannis Chantry* e Parte
Poſtica Hoſpitii Lincolnienſis; Et *Tho.*
Atkinſon ad Inſigne Cygni Albi in Divi Pauli
Cœmiterio, Bibliopolarum, *London*, 1706.

FIG. 3.

In 1709, appeared "Licentia Poetica discussed, or the true Test of Poetry; without which it is difficult to judge of or compose a correct English poem. To which are added critical observations on the principal ancient and modern poets viz,—Homer, Horace, Virgil, Milton, Cowley, Dryden, etc., as frequently liable to just censure."

The remaining theologico-metaphysical books were the following:

(1) "Thoughts Concerning Human Soul, demonstrating the notion of human soul as believed to be a spiritual immortal substance united to human body to be a plain heathenish invention and not consonant to the principles of philosophy, reason and religion, or &c." 8vo. "Lond., 1702." Published under the pseudonym "Estibius Psychalethes," which he dedicated to the Clergy of the Church of England.

(2) "Further Thoughts Concerning Human Soul, in defense of Second Thoughts," wherein "The weak Efforts of the Reverend Mr. Turner, and other less significant writers are occasionally Answer'd." 8vo. "Lond., 1703." In this work he sought to refute the charges against him by many that he was an enemy to the accepted Christian revelation.

(3) "The Grand Essay, or a vindication of Reason and Religion against impostures of Philosophy, proving that the existence of any immaterial substance is a philosophical imposture and impossible to be conceived; that all matter and motion must be the foundation of thoughts in man and brutes." 8vo. "Lond., 1704."

(4) "The Gust Scruting; or a serious enquiry into the modern notions of the soul" (an incorrect way of spelling "Just"). 8vo. "Lond., 1704."

Notwithstanding all these diversions, he found time to publish several distinctly medical works in which we are most interested; yet Haller had a low estimate of these, and summarily dismissed Coward as being "non utilissimus scriptor." His medical writings were:

"De Fermento Volatili Nutritio Conjectura, rationis, qua ostendative spiritum volatilem oleosum, e sanguine, suffusum, esse verum ac genuinum concoctionis ac nutritionis instrumentum." 8vo. "Lond., 1695." For this work he received honorable approbation from the President and Censors of the College of Physicians.

"Alcali Vindicatum or, The Acid opiniator not guilty of truth. Being an impartial Enquiry into the erroneous philosophy of a late physico-medical Essay touching Alcali and Acid," 8vo. "Lond. 1698."

"Remediorum Medicinalium Tabula." 18mo., "Lond., 1704." A second edition was published in 1710. This work is mentioned by Haller in the early lists. I have not found any reference of this work existing in America, but I give here a photostatic reproduction of a notice of it among the advertisements of books for sale by the publishers of the next work, which is the one I especially wish to describe in this communication.

"Ophthalmiatria" is devoted to diseases of the eye, and it is here offered as a subject of interest to medical men who are seeking to know the expressions of the science and art of ophthalmology practiced by our forefathers. The British Museum possesses a copy, which has been rebound; and another copy is in the Library of the Royal College of Physicians. It is a small octavo volume (18 × 11.5 cm.) of 188 pages of text matter, published in London in 1706.

This "Tract," so it was denominated by the writer, describes in Latin (except for here and there an English phrase) a number of diseases of the eye as they were known in the latter part of the seventeenth century, and their treatment. The subjects are given in an aphoristic manner, as the title page explains.

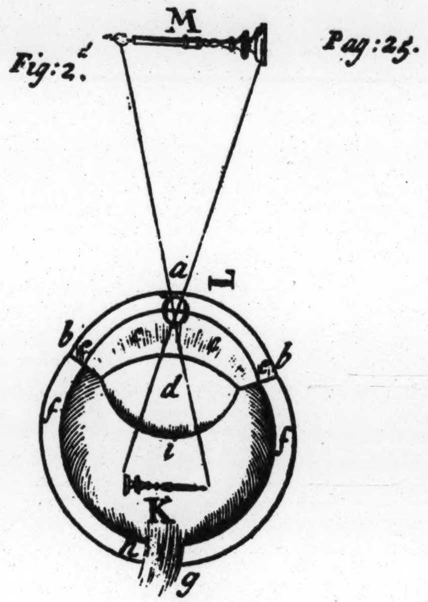
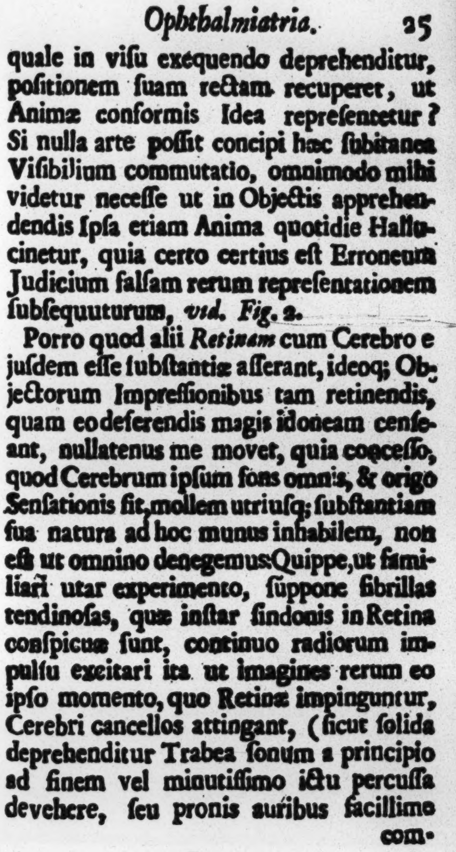


FIG. 4A.

Next to the title page, is the "Epistola Dedicatoria, . . . Viro Doctisimo et Fidei Integerrimae Amico, Manueli Sorrel—Armigero,—S. P. D." Then comes a Latin poem of thirty lines, headed "In Authorem Ophthalmiatriae," and signed "Anonymous." In the "Praefatio" of six pages, he refers to the works of William Briggs, M.D. This is followed by an "Index Capitum & Morborum," and a page of closely printed "Errata," succeeded by two more, separately describing the figures in the text.

In the four pages of the dedication, dated June 24, 1706, Coward compliments Manuel Sorrel, Esqr, "as a man of learning and judgment, in whose approbation of his works the author declares himself satisfied and happy and through which he is enabled to despise the idle and profane mob of sciolists whom certain pious agents of sedition had encouraged to calumniate him." Mr. James regards this dedication as indicating that Manuel Sorrel was the patron of the author, it being the custom of that period for a writer to take a patron; and, he adds, that the Sorrels were an old Ipswich family, Manuel being the son of Andrew Sorrel, the bailiff of the city. He was of St. John's College, Cambridge, and died in 1707.



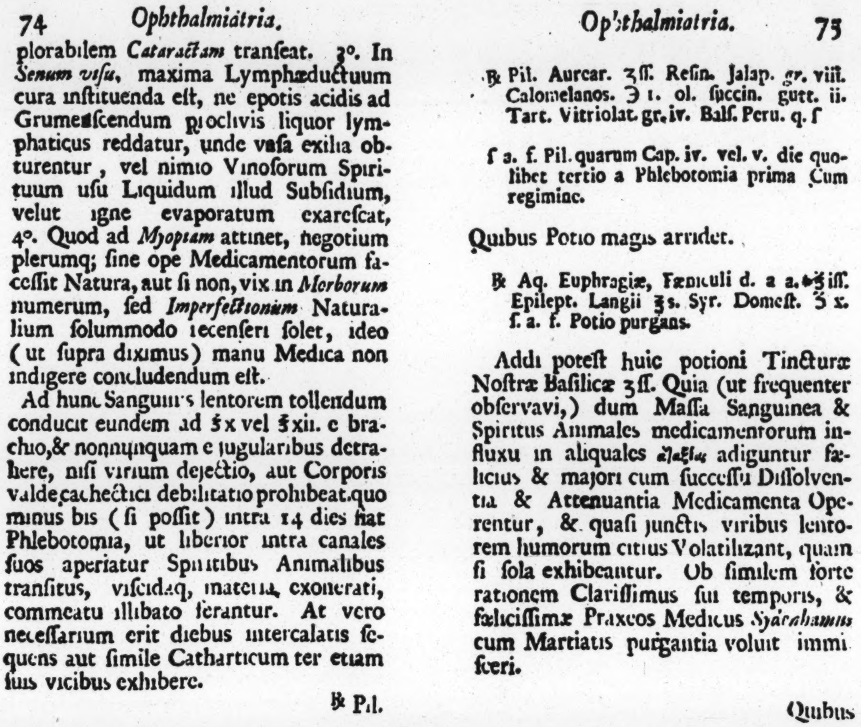
Ophthalmiatria. 25

quale in viſu exequendo deprehenditur, poſitionem ſuam rectam recuperet, ut Animæ conformis Idea repreſentetur? Si nulla arte poſſit concipi hæc ſubitanea Viſibilium commutatio, omnimodo mihi videtur neceſſe ut in Objectis apprehendendis Ipſa etiam Anima quotidie Hallucinetur, quia certo certius eſt Erroneum Judicium falſam rerum repreſentationem ſubſequuturum, *vid. Fig.* 2.

Porro quod alii *Retinam* cum Cerebro e juſdem eſſe ſubſtantiæ aſſerant, ideoq; Objectorum Impreſſionibus tam retinendis, quam eo deferendis magis idoneam cenſeant, nullatenus me movet, quia conceſſo, quod Cerebrum ipſum fons omnis, & origo Senſationis ſit, mollem utriuſq; ſubſtantiam ſua natura ad hoc munus inhabilem, non eſt ut omnino denegemus: Quippe, ut familiari utar experimento, ſuppone fibrillas tendinoſas, quæ inſtar ſindonis in Retina conſpicuæ ſunt, continuo radiorum impulſu excitari ita ut imagines rerum eo ipſo momento, quo Retinæ impinguntur, Cerebri cancellos attingant, (ſicut ſolida deprehenditur Trabea ſonum a principio ad finem vel minutiſſimo ictu percuſſa devehere, ſeu pronis auribus facillime com-

FIG. 4B.

The first Chapter "De Oculo, Ejusq; Partibus" comprises 67 pages. It is a survey of the anatomy of the



74 *Ophthalmiatria.*

plorabilem *Cataractam* tranſeat. 3°. In *Senum viſu*, maxima Lymphæductuum cura inſtituenda eſt, ne epotis acidis ad Grumeſcendum proclivis liquor lymphaticus reddatur, unde vaſa exilia obturentur, vel nimio Vinoſorum Spirituum uſu Liquidum illud Subſidium, velut igne evaporatum exareſcat, 4°. Quod ad *Myopiam* attinet, negotium plerumq; ſine ope Medicamentorum faceſſit Natura, aut ſi non, vix in *Morborum* numerum, ſed *Imperfectionum* Naturalium ſolummodo recenſeri ſolet, ideo (ut ſupra diximus) manu Medica non indigere concludendum eſt.

Ad hunc Sanguinis lentorem tollendum conducit eundem ad ℥x vel ℥xii. e brachio,& nonnunquam e jugularibus detrahere, niſi virium dejectio, aut Corporis valde cachectici debilitatio prohibeat, quo minus bis (ſi poſſit) intra 14 dies fiat Phlebotomia, ut liberior intra canales ſuos aperiatur Spiritibus Animalibus tranſitus, viſcidaq; materia exonerati, commeatu illibato ferantur. At vero neceſſarium erit diebus intercalatis ſequens aut ſimile Catharticum ter etiam ſuis vicibus exhibere.

℞ Pil.

Ophthalmiatria. 75

℞ Pil. Aurear. ʒſſ. Reſin. Jalap. *gr.* viii. Calomelanos. ℈ i. ol. ſuccin. gutt. ii. Tart. Vitriolat. gr. iv. Balſ. Peru. q. ſ.

ſ. a. f. Pil. quarum Cap. iv. vel. v. die quolibet tertio a Phlebotomia prima Cum regimine.

Quibus Potio magis arridet.

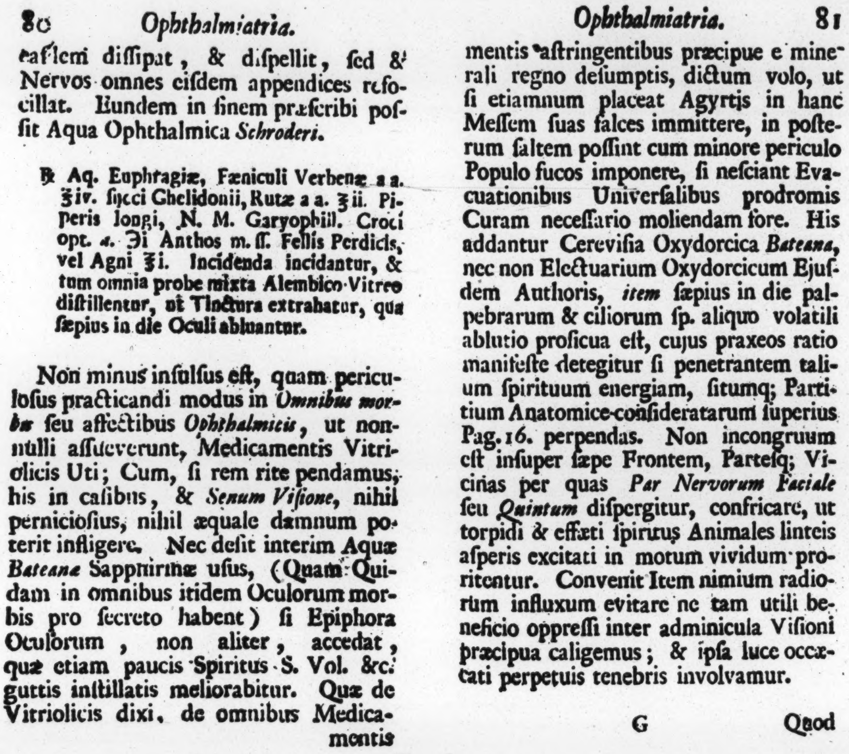
℞ Aq. Euphragiæ, Fœniculi d. a a. ʒiſſ. Epilept. Langii ʒs. Syr. Domeſt. ℥ x. ſ. a. f. Potio purgans.

Addi poteſt huic potioni Tincturæ Noſtræ Baſilicæ ʒſſ. Quia (ut frequenter obſervavi,) dum Maſſa Sanguinea & Spiritus Animales medicamentorum influxu in aliquales [illegible] adiguntur fælicius & majori cum ſucceſſu Diſſolventia & Attenuantia Medicamenta Operentur, & quaſi junctis viribus lentorem humorum citius Volatilizant, quam ſi ſola exhibeantur. Ob ſimilem forte rationem Clariſſimus ſui temporis, & fæliciſſimæ Praxeos Medicus *Sydenhamus* cum Martiatis purgantia voluit immiſceri.

Quibus

FIG. 5.

eye, as known in Coward's day, during which numerous references are made to Brigg's descriptions, and in it the author presents his metaphysical and heterodoxical conceptions. There is an extensive description of the eye with its muscles, blood vessels, its nerves with their connection with the brain. It is in this chapter that the two engravings are to be found. The first is the quite crude drawing of the globe and its attached muscles, copied after Figure 1 in Brigg's "Ophthalmo-Graphia," 1686; the other (Fig. 4), that of an axis section of the globe to show the refraction of images cast by candelabra, which has been adapted from Brigg's "Fig. v." He describes (p. 23) the manner by which vision is performed and accounted for; then he considers (p. 26) the notion of an "immaterial substance residing in the Pineal Gland," by the help of which (so he tells us) "the Philosophers of the day accounted for every phenomenon relating to sensation." Descartes, the philosopher, considered the pineal gland (the conarium) to be the seat of the soul, because "it is the only part of the brain that appeared as a single body," which idea, of itself, is interesting to us today; and, also because later researches have proved the conarium to be a rudimentary eye. Having exposed and ridiculed "the Cartesian hypothesis as empty and unphilosophical so far as relates to vision," Coward adds that, "He hath said enough on the subject elsewhere" and he would "exhort the learned of all countries to examine thoroughly and candidly what absurd, ridiculous and, almost blasphemous, opinions follow from the doctrine of an 'immaterial substance.'"



80 *Ophthalmiatria.*

eaſdem diſſipat, & diſpellit, ſed & Nervos omnes eiſdem appendices reſocillat. Eundem in ſinem præſcribi poſſit Aqua Ophthalmica *Schroderi*.

℞ Aq. Euphragiæ, Fæniculi Verbenæ a a. ℥iv. ſucci Chelidonii, Rutæ a a. ℥ii. Piperis longi, N. M. Garyophill. Croci opt. *a.* ℈i Anthos m. ſſ. Fellis Perdicis, vel Agni ℥i. Incidenda incidantur, & tum omnia probe mixta Alembico Vitreo diſtillentur, ut Tinctura extrahatur, qua ſæpius in die Oculi abluantur.

Non minus inſulſus eſt, quam periculoſus practicandi modus in *Omnibus morbis* ſeu affectibus *Ophthalmicis*, ut nonnulli aſſueverunt, Medicamentis Vitriolicis Uti; Cum, ſi rem rite pendamus, his in caſibus, & *Senum Viſione*, nihil pernicioſius, nihil æquale damnum poterit infligere. Nec deſit interim Aquæ *Bateanæ* Sapphirinæ uſus, (Quam Quidam in omnibus itidem Oculorum morbis pro ſecreto habent) ſi Epiphora Oculorum, non aliter, accedat, quæ etiam paucis Spiritus S. Vol. &c. guttis inſtillatis meliorabitur. Quæ de Vitriolicis dixi, de omnibus Medica-

mentis

Ophthalmiatria. 81

mentis aſtringentibus præcipue e minerali regno deſumptis, dictum volo, ut ſi etiamnum placeat Agyrtis in hanc Meſſem ſuas falces immittere, in poſterum ſaltem poſſint cum minore periculo Populo fucos imponere, ſi neſciant Evacuationibus Univerſalibus prodromis Curam neceſſario moliendam fore. His addantur Cereviſia Oxydorcica *Bateana*, nec non Electuarium Oxydorcicum Ejuſdem Authoris, *item* ſæpius in die palpebrarum & ciliorum ſp. aliquo volatili ablutio proſicua eſt, cujus praxeos ratio manifeſte detegitur ſi penetrantem talium ſpirituum energiam, ſitumq; Partitium Anatomice-conſideratarum ſuperius Pag. 16. perpendas. Non incongruum eſt inſuper ſæpe Frontem, Parteſq; Vicinas per quas *Par Nervorum Faciale* ſeu *Quintum* diſpergitur, confricare, ut torpidi & effæti ſpiritus Animales linteis aſperis excitati in motum vividum proritentur. Convenit Item nimium radiorum influxum evitare ne tam utili beneficio oppreſſi inter adminicula Viſioni præcipua caligemus; & ipſa luce occæcati perpetuis tenebris involvamur.

G Quod

Fig. 6.

Then comes Chapter II, "De Visus Hebitudine" (the early owner of my copy has corrected the misspelling "i" instead of "e") Cap. III. "De Albugine, Leucomate, seu Macula Corneae" ("*A Pearl of Speck in the Eye*"), followed by Chapters with these headings: "De Hyopyo, 'Anglice,' '*A Running Sore in the Eyes*' & Pterygio; De Phlyctaenis, Ruptura, Tumoribus & Ulceribus Corneae; De Rhyade & Eccanthide; De Aegilope, seu Fistula Lachrymali; De Epiphora; De Ophthalmia," in which Chapter he mentions glaucoma yet does not describe that affection; "De Suffusione, seu Cataracta, De Amaurosi, seu Gutta Serena" (evidently what is now known as glaucoma). The final Chapter is headed "De Tinctura Basilica Nostra," the old man's favorite nostrum, which he combines with several of his prescriptions.

For the dull sight, which he found to be dependent upon many causes, including cataract, as well as myopia, the treatment was quite severe, both locally and general, consisting in bloodletting "ad℥ x vel℥xiii. e brachio," being mindful of the debility of the cachectic; cathartics, diuresis and sweating, and the prescription (p. 75) shown in Figure 5, and as an eye water (p. 80) that reproduced as Figure 6.

One must agree with Mr. James,

"that his treatment must have been a perfect nightmare"; also, as he further suggests, "that most of Coward's patients would have preferred his aphorisms to his purgation."

Hirschberg considered "Ophthalmiatria" as the work of a charlatan, although frequently throughout it Coward refers to the questionable practices of "Agyrtae" (swindlers) as in the passages (p. 149): "Nam inde est quod varii Agyrtae in *Ophthalmia Curanda* toties hallucinantur"; "Aut si adeo faeliciter erraverint Agyrtae ut sine Oculi dispendio fatalem Patientes ictus evitaverint."

The work was very much criticized, particularly by Woolhouse, who, in "Sur la cataracti et la glaucome," in a list of the works known to him, refers to it "as a little foolish book, filled with trifles and not to be trusted because of its profound ignorance of the subject upon which it treats." To those who are familiar with Woolhouse and his methods, such a judgment need not be taken too seriously.

Le Cerf, published in 1719, a Latin work, setting forth Woolhouse's criticism of "Ophthalmiatria," wherein Coward's little book is compared especially with the greatness of Woolhouse himself, and to quite all other authors comprising the Bibliographica Ophthalmica known at that time. The several chapters are analyzed almost page by page and Coward is frequently charged with being an imitator of those who had preceded him. An excellent summary of the bibliography of ophthalmology, available at the opening of the eighteenth century, is given in this chapter and should be of interest to the student of medical history. A copy of this extraordinary book is possessed by the Philadelphia Library Company.

In a perusal of Coward's "little book," one may imagine that the author might have had an intimate acquaintance with the books of Nicholas Culpeper, especially his translations of the writings of Riverius and of Riolanus, which Culpeper published in 1658.

In attempting to understand the author's thesis, it should be remembered that "the ophthalmologist, of even a hundred and fifty years ago, was but poorly equipped. Although his knowledge of anatomy was moderately good, his conception of pathology was poor. His methods of examination, however, were limited to inspection with the unaided eye and to palpation, and his treatment was almost entirely empirical." In Coward's day, disease of the eye was not attended to by honorable members of the medical profession, on the contrary rather by charlatans and itinerant quacks. "Ophthalmiatria," therefore, is an attempt to present to the medical public a systematic treatise covering the diseases of the eye as they were known at the end of the seventeenth century. It was Coward's last systematic publication, unless one will consider as his work "Hydro-Sidereon: or a treatise of Ferruginous Waters, especially the Ipswich Spa. With a demonstration also of the great variety and folly in buying, and cheats in selling German Spaw-Water in England. W. C. London 1717," 8vo.

Under Coward's name "Ophthalmiatria" is the only one listed in the Surgeon General's Catalogue. I have not yet traced another copy in this country; it is doubtless an extremely rare book.

I have no knowledge of when Chantry and Atkinson, the printers, ceased to exist; no traces of them could be found at Stationers' Hall. Chantry's shop was "at the Sign of Lincoln's-Inn-Square, at Lincoln's-Inn Back Gate," and Atkinson's "at the White Swan in St. Paul's Churchyard," the great publishing section of that day in London.

My copy retains much of the original binding; it has been rebacked in polished dark leather with gilt title and date. The sides are of calf with lines and floral sprays in the angles of the panels in blind-tooling, in much the manner as on the copy possessed by the British Museum. The corners show foxing which has been very neatly repaired. On the inside is the label of the "Standfast Library," and on the back of the title page is written: "This book belongs to the Library in the Charity School Chamber of Nottingham given by Dr. William Standfast."

Dr. Standfast, the founder of this Library, was a native of Bristol, who entered New College, Oxford, in 1698, at the early age of fifteen. Passing through the academic degree, he later proceeded to those of medicine, receiving the Doctorate in 1729. In the meantime, he began a course in theology and, in 1721, became the Rector of the church at Clifton, where he served till his death in 1754. In 1744, he donated to the town of Nottingham his large library which was deposited in the Bluecoat Charity School, to serve as the nucleus of a public library. This library was neglected and languished until 1816, when the trustees placed the collection in a recently formed subscription library which still exists and is known as the "Bromley House Library," where the old collections can be consulted. Just how and when my copy of Coward's "Ophthalmiatria" wandered from the shelves no one knows, for at no time has the Library been dispersed or the books formally sold. However, the work is not listed in the existing catalogues of Bromley House. My copy was presented to me by the late Dr. Astley Ashhurst, and doubtless was from the collection of the rare books in the library of his father, Dr. John Ashhurst, deceased 1900.

The finding of an old book relating to the subjects of one's studies is, to some of us, like what the discovery of an unknown land was to the early voyagers. Because, in the domain of ophthalmology, the history of medicine has been that of the evolution of discovery and exploration, nothing in its pathways that has been turned up towards the light can be without interest to all who now enjoy the rewards of the labors of the early adventurers in the science. And so I have been led to tell of a book and its author, both, until recently, entirely unknown to me.

The only account of the personality of Coward I found was in "Biographica Britannica," published at the end of the eighteenth century, in which the following estimate of his character is expressed:

> Though his medical works are now in no reputation, and his other writings are but little attended to, it is, nevertheless, certain that he was a man of considerable abilities and literature; and we have esteemed it a duty incumbent upon us to reduce his name from the injustice which hath been done it with respect to religion. However erroneous his peculiar sentiments may have been, there is no reason to doubt of the sincerity of his belief in the Gospel, and of his zeal for its honour.

Certainly, Coward was a man of "considerable abilities." Dean Swift classed him "among the Free Thinkers, and regarded as one of those who use their understanding; whereas those who have Religion do not."

Coward was an intimate of that eminent physician and naturalist, Dr. Hans Sloane, the founder of the British Museum. Dr. Sloane carried his friendship so far as to take upon himself the supervision of the proof of "Ophthalmiatria." There was published in the *Gentleman's Magazine* for 1787 a letter, dated May 28, 1706, preserved in the Sloane collection, which Coward wrote to Sir Hans, then Censor of the College of Physicians, of which he later became the President. It appears that Dr. Sloane had wished Coward to alter what related to his private opinion concerning the Soul, and "to add something in commendation of the 'tender consciences' of Physicians in point of Religion." The former, our author declared, "cannot be altered"; and, with regard to the latter, he thought "that should he add anything on that head, if on that account a license be denied, it would be interpreted a droll or ridicule in the face of the world rather than an excusatory just plea."

It is apparent, therefrom, that the many pamphlets written to dispute his theorems, as well as the burning of his books, had not the least effect in abating Coward's zeal for the peculiar sentiments he held; and, moreover, that he retained a strong sense of the harsh treatment he had received. In "Ophthalmiatria," in discussing the arguments relating to an "immaterial substance," he hints that his adversaries "not being able to confute him by reasoning, endeavored to silence him by fire and faggot."

The letter is dated from "'The Green Bell,' over against 'The Castle Tavern,' near Holborn, in Fetter-Lane." There is reason, therefore, to believe Coward no longer resided in London and was only an occasional visitor in the town for the purpose of publication. Indeed, the facts as ascertained from the lists in the College of Physicians, in the Catalogue for 1706, preserved in the British Museum, are that Coward, who stands under the head of "Candidates," is then for the first time mentioned as residing in the country. We may conjecture that the persecutions he had met with, and the unpopularity which arose from his works, might have induced him to leave the metropolis; yet, in the space of twelve years, it does not appear to which part he had retired. In the "List" for 1718, however, Coward is mentioned as residing in Ipswich.

In the same number of the *Gentleman's Magazine*, already referred to, it appears that he wrote again to his old friend, from Ipswich, in 1772. The occasion for this letter is somewhat curious. From the newspapers, Coward had learned that the Duchess Dowager of Marlborough proposed to give "five hundred guineas to any person who should present her with an epitaph, suitable to the late Duke her husband's character." "Now," writes Coward, "I have one by me which gives him his just character, without flattery or ostentation, and which I verily believe may be acceptable to any learned man." He adds that "he heard that the epitaph was to be approved by certain learned and influential persons; which if it is true," he begs, "Sir Hans would give him leave to send it on for his approbation and recommendation."

From the omission of the name of "William Coward" in the Roll of the

Royal College of Physicians issued in 1725, it is evident that he was then dead; and, as his name does not appear again on the Roll, his death is believed to have occurred, at or near Ipswich, about that time. No portrait of Coward is known to exist; a thorough search through the files at the British Museum was without success.

His medical works along with his other writings are all forgotten long ago. Had not Dr. Ashhurst sent this small volume to me, I never would have been induced to search out the facts of the author's life.

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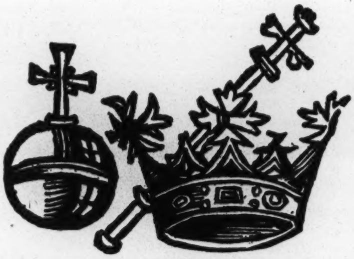
To Mr. S. Wood, of the Library of the Royal College of Surgeons, London, I am indebted for his patient and extensive enquiries concerning Coward and his works. He has sent valuable information, from Stationers' Hall; the Library of the British Museum; *Notes and Queries* 3rd S. Vol. ix, 1866, p. 390–460; and Bardsley's Dictionary of English & Welsh Surnames, 1901. "Standfast." Mr. Walton McDaniel, Librarian of the College of Physicians of Philadelphia, a good Latinist, helped me much in the translating of passages from the old books.



GALEN'S WRITINGS AND INFLUENCES INSPIRING THEM

By JOSEPH WALSH, M.D.

PHILADELPHIA

Part III, Continued*

Methodology as inaugurated by Asclepiades, an educated intellectual student, a friend of Cicero, and probably of Lucretius, followed the philosophical doctrines of Leucippus and Democritus, teaching that the body was an aggregation of atoms which had come together fortuitously and that the different organs were evolved through functional activity. Between the atoms were pores or minute openings. When these were symmetrical health continued, when they were larger, or smaller than normal, disease was produced. The disciples of Methodology did not deny the gods, but they denied their providence or care of mankind, and at least some believed their existence not proved. The Pergamite believed the body was specially created by God and every organ was perfect for the function designed.

Prejudiced against this sect by his pious upbringing in the shadow of the miracle-working shrine of Aesculapius, and by the array of dogmatists who had been his instructors (Satyrus, Stratonicus, Ephicianus, Pelops, Numesianus and Heraclianus), this enrollment shows his signal desire for knowledge and shows too that Julian in spite of his youth and superficial education must have already achieved some distinction. His age is judged by the fact that forty-five years later (197 A. D.) he was still active and writing prolificly. He was probably not more than five to ten years older than his rambunctious pupil. Unable to endure what he considered Julian's superficiality and lack of logic, Galen did not complete the course, remaining evidently less than a year, and if this Methodologist's course corresponded with that of the Thessalians less than six months.

He had undoubtedly been hearing about the success of this sect in Rome with its easy and definite pathology, simplified classification of disease and pleasant treatment. With diseases dependent on the size of the pores, all could be reduced to two called respectively the tight and the loose. These were relieved by relaxing or binding foods, drugs, baths and other measures though the principal dependence was on the first. In occasional cases there was a combination of tightness and looseness in the body, one part manifesting one, another the other, making a third disease in their classification, and one requiring a mixed medication. Wine was one of their favorite remedies and their slogan of treatment was "quick, safe and pleasant." It is not a surprise that in spite of his religious prejudice he was curious as to its teachings.

We have considerable sympathy with Asclepiades who inaugurated evolution in medical study, though we disagree with his pathology and treatment. We have none with the charlatan Thessalus who had not sufficient intelligence to understand the advanced doctrines of his predecessor, and who thought he himself was the greatest of physicians because he reduced all diseases to two.

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*The first installment of this article appeared in the September, 1935, issue of Annals of Medical History, p. 428.

No student has castigated a teacher in more opprobious terms or administered the lash more furiously than Galen in his description of Julian. Garrulous, loquacious, uneducated, stupid are only some of the adjectives employed. That the criticism was partially warranted is evident, that the not very intellectual Methodologist deserved all of these philippics of abuse is questionable. Recalling that Galen's tirades were written from twenty to forty-five years later after he had become more and more incensed against the Thessalian Methodologists in Rome makes likely unconscious exaggeration.

In a work (xvii$_1$, 806) published between 193 and 196, in other words, forty years later, he goes into some of his medical experiences referring without doubt particularly to this Methodological course: "In Alexandria teachers little versed in medicine themselves, taught a sophistical art in long untrustworthy lectures to crowds of boys in their teens (*μειρακιοίς*) who never got near the sick, and with little attention to diet."

In other words, the past twenty-two year old Galen, with a brilliant preliminary education in arts, philosophy and medicine, found himself associated with crowds of boys three or more years younger listening to didactic lectures from a man not much older, and apparently less well educated than himself. In spite of the fact that he took the course particularly for treatment which the sect stressed above anatomy and physiology, he was given no bedside instruction which he felt the subject demanded, and little was said about diet which the progenitor Asclepiades deemed so important.

Erasistratus Asclepiades

Fig 4. Erasistratus Enjoys the Distinction of Being the Greatest Physician of Pre-Christian Times after Hippocrates. Asclepiades Was the Progenitor of Methodology and the Introducer of Evolution into Medical Study. The Former Was a Teacher, the Latter a Pupil in Alexandria. Galen Recognized Their Eminence, but Their Materialism Was so at Variance with His Pious Beliefs That Like Controversialists Frequently He Accuses Them of Dishonesty. The Portrait of Erasistratus Is from the Mural by Bourgeois in the Medical School of Paris, That of Asclepiades from Visconti.

By sophistical he meant plausible though decidedly not logical. There was ardent strife between men who called themselves sophists and others who called themselves philosophers in the different professions. The philosopher tried to get at the truth and follow it even when to his disadvantage. The sophist equally well educated believed it proper to take advantage of knowledge for his own benefit, or that of his client whether the client was a person, a state or a sect. The philosopher was consistent, though of course, he might change his opinion due to further knowledge. The sophist recognizing the difficulties of proof and knowing the arguments on both sides, employed those suitable to the occasion. The philosopher Marcus Aurelius refused to go on with the study of rhetoric since its embellishments were for the purpose of persuading without proof; his teacher, the sophist Fronto, endeavored to show him that he was wrong,[10] that even Socrates practiced dissimulation for the purpose of leading his adversary on so as later to crush him, but Marcus was staunch enough not to be convinced.

Galen shows a tendency to describe the majority of his adversaries as sophists, especially when hard pushed in an argument. His employment of this designation is usually against medical men (VIII, 19), most commonly Thessalian Methodologists, though only less frequently Erasistrateans and Empirics. Special individuals to whom he applies it are Erasistratus himself, Asclepiades, Soranus of Ephesus, Thessalus, Lycus and Julian, and occasionally even the highly esteemed Archigenes.

About 175, a little more than twenty years later, in his great work on treatment, Galen informs Hiero, a student in his teens for whom he wrote it, and who was hearing constantly of the results of the Methodologists around him in Rome (x, 53):

> If I told you what certain Methodologists taught, I would be foolishly drawn from my subject which is to teach the scientific and practical. Perhaps the opportunity will later occur of mentioning their differences from one another, as well as something about the views of Menemachus, who simply botched everything, and of the trifling Olympicus, Apollonius the Cyprian, Soranus of Ephesus, and the still living Julian with whom I was often associated in order to learn from his actual words the nonsense he could utter, since he was unable even to explain the difference between pathos and nosos.

All of these were Methodologists active at various times between 75 and 135 A. D. Olympicus was the teacher of Apollonius, who was in turn the teacher of Julian. We know very little about these three except from Galen, but we esteem Soranus of Ephesus almost as highly as the Pergamite himself.

To understand much of the controversy between Galen and Julian, which is about to follow, it is necessary to know that the Methodologists made the two words "nosos" and "pathos" synonymous and employed them indiscriminately to signify disease (x, 52), while physicians generally, the Pergamite among the number, made a considerable distinction in that nosos represented the organic lesion and pathos the functional disturbance. For instance, in apoplexy, nosos was applied to the lesion in the brain, and pathos to the paralysis of the extremities; abscess of the lung was nosos, interference with respiration pathos; ulcer of the stomach nosos, indigestion pathos. Our definition of these terms corresponds with Galen's as is shown by Aschoff in connection with inflammation,[11] except in cases in which his knowledge was deficient, for instance, the Pergamite made edema of the feet nosos, interference with walking pathos, while we make the endocarditis (which he was unable to recognize) nosos and the consequent edema pathos. Galen sometimes employs the word "nosema" for nosos, but since he tells us (x, 91) that these two are exactly synonymous, we have uniformly made it nosos in order to avoid confusion.

Galen continues (x, 53):

> The best proof of this [lack of knowledge on the part of Julian] is that during the more than twenty years which have elapsed since we were with him in Alexandria, he has written again and again treatises for beginners, changing them

constantly because he could not make up his mind. Yet in none has he dared to explain his understanding of disease (nosos), but devotes most of these voluminous writings to the discussion of matters in no way relevant, such as whether or not the art of painting is useful to physicians. In fact with all this writing he has never yet shown the difference between nosos and pathos, but like Menemachus dissimulates, though he understands clearly the absurdity of the Methodological doctrine.

To my interrogations he gave so many and such obscure responses that I could make nothing of what he said, and I was forced to say so to the man, because he seemed to me to differ from Olympicus who was the father of this teaching. For Julian was the pupil of Apollonius the Cyprian, and he the pupil of Olympicus.

As I stated previously, Olympicus dared to define health as the condition existing in the absence of disease (nosos) and disease (pathos) as the change of the natural state into a lasting unnatural. Each of these shows a definite lack of reasoning, as I then said to Julian, and now say again.

This deficiency in logic is shown in two ways: first, he employs terms in the definition of one which cannot be used negatively in the definition of the other, though he is endeavoring to define health and disease which Galen considered to be opposites; and second, he uses the word nosos in one definition and pathos in the other to signify disease, though Galen considered they were by no means synonymous.

"Why," I asked, "are Methodologists so confusing? Olympicus states that health is the condition in the absence of disease (nosos), and then adds, the condition is shown by the continuance and strength of the natural functions. This is most obscure," I said, "since we do not know whether he refers the word condition to the functions or to the body itself, or to both. Perchance, however, with the other Methodologists he insists on differing from the Greeks, and refers the condition not to the body but to the functions, so that the definition may be understood: Health is the condition of the functions in the absence of disease."

The Greeks, among them Hippocrates, employed the word condition (diathesis) only with reference to the body and not to the functions while Olympicus appeared to be applying it indiscriminately.

Galen continues:

Of course, he might have joined both and, at least, made it clearer, saying that health is the condition of both the functions and of the body in the absence of disease. Yet when he described this condition as the continuance and strength of the natural functions, it is not clear whether he meant this part to be considered with what was said before, making the whole definition read, health is the condition of the body in the absence of disease and the continued action of the functions in their ordinary strength, or whether the latter part of the definition was meant to stand by itself as many of the Methodologists affirm, who say that health is the continued natural action of the functions in their proper relationship to one another.

This last is practically Galen's own definition of health.

If this is true, I do not see why he taught that health is a condition in the absence of disease, since the clause "in the absence of disease" is so self-evident as to make even a boy laugh. And if it could be thus defined, then disease would be a condition of the body in the absence of health. Each definition, thereby, describing not what it is, but what it is not.

Passing over what is not pertinent to the question we find that in the definition of health he cannot refrain from attributing everything to the functions either alone or by confusingly bringing in the word condition, though in the definition of disease (pathos), Olympicus made no mention of functions. For he simply said that disease (pathos) is a change of the body from the natural state to that which is unnatural.

I contended each definition ought to be applied either to the functions or to the condition of the body, and though I have often related to you, dear Hiero, Julian's response, it will not be amiss to repeat it: "It is not to be wondered at," he said "that health is described in connection with the strength and constancy of the functions and disease (nosos) in the unnatural condition of the body, for these are not contraries, as you seem to think, because there is a medium between, which is neither health nor disease."

Hearing this I went away surprised and sorrowful, for I had never before heard anything so absolutely silly, and I was sorrowful not alone at his want of sense, but because he had so many senseless pupils, who, although they ought to have recognized this fallacy of the Methodologists at the very beginning of the course, did not withdraw from the sect, and if they did not, they were even more stupid than I thought them. "Why," I asked, "is disease (nosos) not contrary to health, because there is a medium between? By this reasoning, black could not be contrary to white, because of the intermediate colors, yellow, blue, red and the others; nor heat to cold, because of the intermediate tepid and temperate."

Capable of recognizing neither slight nor serious fallacies, as is evident from the foregoing, can we hope that these learned Methodologists will ever reach the truth? Indeed not. . . . For surely no one can be so stupid as to put health in one category and disease (nosos) in another, when it is quite evident they should be considered together either in connection with functions or with the condition of the individual organs.

If [insisting on using the word nosos for disease] they apply the word health to normal functioning they must apply the word nosos to abnormal. . . . For no one doubts that if proper vision points to health, interference with vision points to disease (nosos); the same is true of proper hearing and deafness, good digestion and indigestion. . . . It is a sign of health when we can move about freely, while cramps, tremors, paralyses and everything interfering with voluntary movement is a sign of disease (nosos). . . .

If these are the nosos, however, the conditions which bring them about must be the causes of this nosos. Hence inflammation, erysipelas, abscess, ulcer and edema would not be nosos [but the causes of nosos]. If, however, these represent nosos, the others must not be nosos. [As previously stated Galen considered the organic lesion like abscess of the lung to be nosos and the interference with the function respiration to be pathos.]

For we are dealing with two entirely different things—the body and the functions. The eye, tongue, ear and legs are individual parts of the body, while sight, speech, hearing and walking are functions of these parts. If nosos has to do with the body it has nothing to do with the functions, and if nosos is applicable to the latter it can have nothing to do with the former. . . .

Like Aristotle Galen had a tidy mind, and was anxious that things be called by their proper names, yet he did not let this idea run away with him as is evident from the continuation of his discourse:

The physician who designates by the same term a disturbance of function and a condition of the body, may still possess a picture of disease sufficient for treatment, since this depends on a knowledge of the subject not on acquaintanceship with terms. There are, however, many physicians who fail to understand this and think that those who believe that disease is a condition of the body differ from those who consider it a disturbance of function because they fail to differentiate between what may be learned by logic and by empiricism.

In addition to this reported discussion in the classroom, Galen about forty-four years later (197 A. D.) reviewed Julian's well-known work in forty-eight books written against the Aphorisms of Hippocrates. For proper appreciation it is necessary to recall that the Pergamite looked upon the great Coan as almost infallible, to such an extent in fact as sometimes to believe his writings inspired, or even that he might have been a god temporarily sojourning on earth. It is to be recalled also that modern criticism almost follows Galen in that it is usually allowed the number of observations made by Hippocrates which have been proved wrong, except in matters about which nothing could be known at the time, are so few as to be practically negligible. Added to this regard for the great master was the Pergamite's religious prejudice against anything written by Methodologists.

Thirteen centuries after Hippocrates' death Suidas pronounced the work on Aphorisms to be one "surpassing the genius of man." In the middle of the last century Francis Adams[12] considered it the most celebrated treatise of the master, and up until recently it was accounted one of the most important productions of antiquity. In this review of Julian's work against the Hippocratic Aphorisms (XVIII$_1$, 246) the sixty-seven year old Pergamite manifests the prejudices of the old man that he was, in a position of eminence, decrying liberty of speech in favor of authority and ready to remove the incentive of ambition from the enthusiastic investigator.

In this review he declares:

> It would indeed be splendid, if legislators could inflict on the false accuser befitting punishment so that he would have before him the penalties. Though I do not know how to prosecute such an injury, and the law is probably not broad enough to include it, I still think the ignorant who dare to inveigh against great men ought to be brought to justice. Just as formerly in Egypt each discovery in the arts was judged by a conference of the learned and inscribed publicly on a column in a sacred place, so some council of men of integrity and learning should be constituted who would review the new, expose the useful and true and condemn the reverse. It would even be wise, if, as in antiquity, they did not refer to the name of the author, for thus the immoderate desire of glory of the ambitious was repressed.
>
> But now, since it is allowed to everybody to write and even to the uneducated to judge, insolent men like Thessalus [the founder of the quack, Thessalian Methodological sect] are celebrated by the multitude, though he sneered at Hippocrates and his writings in his one book in which he argues against the aphorisms in spite of the fact that he was not the least acquainted with the meaning. Proper it surely was to raise controversies before he knew what he was talking about. If he had learned the art, he would never have dared. In fact to do this takes impudence like that of Julian still in Alexandria, who rose to fame on his eight and forty books against the aphorisms of Hippocrates. I have taken up the second in which he thinks this aphorism to be false.
>
> "In disorders of the bowels and vomitings occurring spontaneously, if the mat-

ters purged be such as ought to be purged they do good, and are well borne; but if not, the contrary. And so with artificial evacuations, if they consist of such matters as should be evacuated, they do good, and are well borne; but if not, the contrary."

I would like to mention first what brought this work into our hands lest even a longer time be consumed in vain on what he wrote on this aphorism. For forced to answer I seem to be wasting time because the treatise does not rise to medical knowledge. . . .

This aphorism explains an important precept of medicine . . . and if Julian had learned the art from teachers who understood Hippocrates, he would never have questioned it. But since neither he nor Thessalus, the equally impudent chief of the Asclepiadean sect studied real medicine, their ignorance is not to be wondered at.

The Methodologists taught that the body was made up of atoms which had come together fortuitously and in an analogous way the art of healing was the result of noting cure following fortuitous occurrences to the body. For instance, a headache or other complaint becoming well following hemorrhage from a vein in the forehead injured by a fall, the art of healing took advantage of this knowledge and in a similar complaint cut this vein in the forehead. Yet they refused to recognize this aphorism of Hippocrates as true, though it was founded on a similar principal.

Julian impudently brings forward trifles in prolix language against the greatest physicians, and though everyone knows he never studied medicine, he shamelessly tries to injure them. . . .

His writings are not worth the time spent in contradiction; yet, since many of my friends have assiduously requested me to take up the points which he has brought forward, I have done so. . . .

Nobody could be more verbose. Thersites[13] was said to be unbridled of tongue, but to Julian rather should be given the palm, who even among the garrulous surpasses all in garrulity. On this account auditors frequently described him as a blatherskite and windbag. And, he was so stupid that a whole chorus of Muses could never give him intelligence. Since I have been forced to write I have begun by this introduction, so that what is narrated may not be doubted by my readers. About to expose a witless, uneducated man, learned only in his own imagination who has been uttering trifles to his pupils throughout his whole life, among whom on account of his condemnation of the ancients he believes himself to be somebody, I ask that it be conceded to me to demonstrate his ignorance in sharper language than I am accustomed to use.

It would be unreasonable if he was allowed to abuse the most illustrious of the ancients, and I was prohibited from demonstrating his ignorance which is so great that no auditor could fail to recognize it.

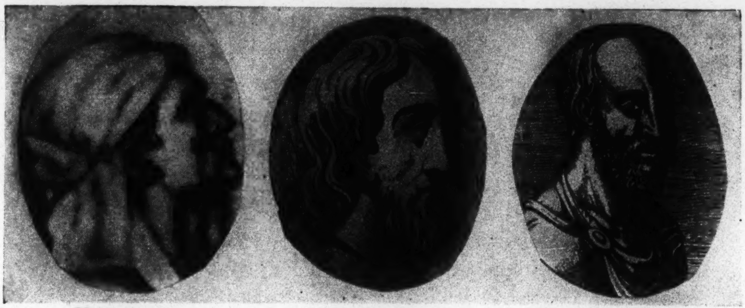
In the beginning of his book, passing over Hippocrates, he inveighs against Sabinus[14] and thus continues throughout the work, yet he entitles it against the aphorisms of Hippocrates, not against the interpretation of Sabinus. Then, as is his custom he trifles over certain obscure words in such a way that if we attempted to answer him we would fill the largest volume before accomplishing anything. Hence it is not easy to treat of his work in writing, but having acquired the capability of explaining the ancients in extempore addresses we will make the endeavor.

He takes up a passage of Julian which attempts to show that all diseases correspond with the Methodologists' classification of tightness and looseness, and points out wherein he differs even from the founders of the sect Asclepiades, Themison and Thessalus.

Hearing Julian contend that the Methodologists follow the teachings of Plato, Aristotle and Zeno, Galen shows that these philosophers considered health to consist in a proper proportion of the four qualities,—heat, cold, humidity and dryness, while Julian makes it consist in the symmetry of the pores. As a consequence he concludes that Julian never even read the philosophers he is naming.

Continuing this polemic along lines no longer interesting, and in places difficult to follow, he almost exhausts the derogatory adjectives of the Greek language in the various descriptions of this Alexandrian teacher, calling him again and again "garrulous Julian," "most illustrious Julian," "most generous of sophists," "Coryphaeus of triflers," and once more "shameless Thersites." Finally, he says (XVIII₁, 291):

> Julian is very like the ass in Aesop's fable. Beholding a little Melitensen dog belonging to the noble Aristositus, dancing around, wagging its tail throwing itself on the couch, and barking with joy, thereby so delighting the guests at table, that all kissed it, the ass proceeded to do likewise hoping for similar caresses.



HEROPHILUS DIOSCORIDES RUFUS OF EPHESUS

FIG. 5. THREE ILLUSTRIOUS PHYSICIANS WHOM GALEN ALMOST CONSTANTLY LAUDS: HEROPHILUS, ONE OF THE EARLY TEACHERS IN THE MUSEUM AND DIOSCORIDES AND RUFUS OF EPHESUS, WHO LIVED SHORTLY BEFORE GALEN AND SPENT AT LEAST SOME TIME IN ALEXANDRIA. HEROPHILUS GAINED SUCH EMINENCE AS TO HAVE A SECT NAMED AFTER HIM. DIOSCORIDES WAS THE AUTHORITY ON MATERIA MEDICA AND IS STILL QUOTED BY LAY PEOPLE IN THE EAST. RUFUS WAS THE COMMENTATOR ON HIPPOCRATES WHOM GALEN ESTEEMED MOST HIGHLY. THE PORTRAIT OF HEROPHILUS IS FROM THE MURAL BY BOURGEOIS IN THE MEDICAL SCHOOL OF PARIS; THE OTHERS FROM NEAR THEIR OWN TIME.

Though these quotations represent only Galen's tirades and not the entire review, it is quite evident that he allowed himself to be carried away. Ilberg[15] even says that here he shows his worst side as a stubborn, quarrelsome, malignant bully attacking his opponent with foaming mouth, and on the first reading this opinion seems justified. A further consideration of the times makes one doubt. Even with intellectuality and social philosophy further advanced, we see the impossibility of controversies not degenerating into personalities. It was much truer then, when even Tertullian, the Christian Barrister (though he later became a Montanist) could describe the heretic Marcion in these terms:[16]

> Nothing in Pontus is so barbarous and sad as the fact that Marcion was born there, fouler than any Scythian, more roving than the wagon-life of the Sar-

matian, more inhuman than the Massagete, more audacious than an Amazon, darker than the Pontic cloud, colder than its winter, more brittle than its ice, more deceitful than the Ister, more craggy than Caucasus. Nay, more, the true Prometheus, Almighty God, is mangled by Marcion's blasphemies. Marcion is more savage than even the beasts of that barbarous region. For what beaver was ever a greater emasculator than he who has abolished the nuptial bond? What Pontic mouse ever had such gnawing powers as he who has gnawed the Gospels to pieces? Verily, O Euxine, thou hast produced a monster more creditable to philosophers than to Christians. . . .

Even St. Paul uses pretty harsh language, especially against renegade co-religionists, and Galen was a rather typical re-incarnation of the travelling apostle becoming more ardent the fiercer the opposition. And two centuries later we find the highly esteemed Jerome at about the age of twenty-seven speaking of his Bishop, Lupicinus of Stridon, as a sick pilot, as blind, a pot-lid and an ass.[17]

Epicurus, of whom Asclepiades and his sect were followers, heaped all sorts of abuse on Pythagoras, Socrates, Plato and Aristotle.[18] Galen could feel he was merely returning some of it on those to whom at least in his opinion it more justly belonged. The scornful retorts of Sylvius and Vesalius fourteen centuries after Galen are justified by historians allowing that it was a foul-mouthed age; centuries hence will be obliged to offer similar justification for many of our medical and political controversies today as has been demonstrated by Radner in his article on "The Intolerance of Great Men."[19] Finally, it is to be recalled that this review was written at the age of sixty-seven after many years of acrimonious discussion with the Thessalian Methodologists in Rome, some of whose doctrines were silly beyond description, after he had achieved prominence and when he thought he was in a position to wipe them out entirely. And it is scarcely to be doubted that he was an important force in their elimination.

A fourth teacher Galen mentions in Alexandria is Lucius, apparently a surgeon from whom he quotes a number of complex prescriptions in the way of powders, plasters and washes for external application. In one (xiii, 648) he points out how Lucius modified the compounding of a plaster of Moschion, consisting of thirteen ingredients, for recent wounds especially of nerves, compound fractures, contusion of the testicle, and other conditions.

It represents a typical prescription of the time, made up of so many ingredients that it would be impossible to decide the effect of each. Yet the physicians were quite convinced that every ingredient and every step in the complex compounding was important. The first discovery Galen credits himself (xiii, 599) with after beginning practice in his native city following his sojourn in Alexandria, is that of at least a much simpler mixture for the treatment of recent and operative wounds.

Another prescription recommended by Lucius (xiii, 852) is that of Asclepiades for noma and other putrid and odoriferous ulcers like ozena (xiii, 844) composed of sulphur, yellow sulphuret of arsenic and copper scales in equal parts to be used dry as a powder, or mixed with honey.

A third (xii, 787) is a prescription for a collyrium for running eyes and for every weakness of vision. It was also recommended for intense pruritus. It was made up of one part each of calcined and natural ammonium chloride, Indian spikenard, myrrh, opium and green olive oil and four parts each of saffron, white lead and gum resin in a menstruum of rain water.

Five or even more ingredients in prescriptions for application externally are, however, not uncommon even today. One of these from the highly regarded dermatologist Macleod[20] is made up of perchloride of mercury, castor oil, acetic acid, spirits of lavender and alcohol; another of bismuth subnitrate, zinc oxide, spirits of camphor, glycerine and water. Many also continue to show individual ingredients recommended by Galen, such as sulphur, liquid pitch, opium, ammonium chloride, zinc oxide, tannic acid, lime, soap, vinegar, sheep fat and wax. Oftentimes too the only change in the menstruum is from Galen's wine, vinegar, or rain water to alcohol, dilute acetic acid or distilled water. This preceptor Lucius is not to be confused with Lucius of Tarsus from whom Galen quotes a prescription for dysentery (XIII, 292).

In addition to studying under Lucius, Julian, Numesianus and Heraclianus, and occupying a position in the anatomical school of the two last, Galen's pen was not idle. During the years in Egypt and the next five years in his native city Pergamum, he published four works. We dignify them by this title since they were more pretentious than mere articles. They were a philosophico-medical treatise in fifteen books, apparently about 165,000 words, on scientific proof or demonstration, a general dictionary in forty-eight books, a medical dictionary in five books and a compend of anatomy. No matter in which time written, it is quite evident they were inspired by his experiences under Julian, and by his studies under Numesianus.

The first was particularly against the Methodologists and what he considered to be their far from logical explanations. The two dictionaries represent dissatisfaction with the general inaccuracy, particularly of medical students, in the use of terms, and this remains true even though they may have been compiled at the instance of a publishing concern by which Galen was paid or given a royalty, since Alexandria was noted for its dictionaries and other philological works over four hundred years. The compend of anatomy was, undoubtedly, associated with his work in the school of Numesianus and Heraclianus. All four are lost.

The principal one was the first which he entitled "On Demonstration" following Aristotle's like designation of his treatise on Posterior Analytics (XIX, 42). Of this he remained so inordinately proud the rest of his life, referring to it in almost every work that it is quite evident he considered it among his masterpieces. It was a disquisition on scientific reasoning, inductive philosophy, applied to medicine, especially treatment. In spite of it being lost an excellent idea of its scope and contents has been elaborated by Müller[21] from quotations in other books of Galen and subsequent writers' references.

It is referred to in the second book of the Teachings of Hippocrates and Plato (V, 213, 218, 219, 226) which we know was written in Rome at the age of thirty-four, and hence it must have been composed before this time.[22] Müller believes it was written in

Pergamum between the age of twenty-seven and thirty-two. We expect to show, however, that he was so engaged with anatomical, experimental and surgical work during these years that it is practically sure it was at least outlined in Alexandria, and probably brought home complete except for the last couple of books.

Ilberg, who understood better his activities during these years, thinks it may have been written in Pergamum between the Fall of 166 and that of 168, and that the reference in the second book of the Teachings of Hippocrates and Plato was introduced in 173 when it was re-edited, but he spent such a short time in Pergamum during these years as we have shown[3] that this is impossible.

Further in the Catalogue (XIX, 43) of his various works Galen names forty-four treatises written "after it to elucidate special points," and at least one of these "The Proper Use of Names" is also referred to in the Teachings of Hippocrates and Plato (V, 214, 218, 225, 328) and the most likely time for this little article was during his first Roman sojourn (163–166 A.D.). It is also true that Ilberg believes "The Best Doctrine against Favorinus sustaining Epictetus," which is likewise one of the forty-four, was a lecture to students during this first sojourn.

This medico-philosophical treatise was a dissertation on prior and posterior analytics, syllogisms and demonstration in which by the analysis of the different kinds of premises in regard to their practical value, he endeavored to carry proof to the limits of mathematical certainty. Though the method is intrinsically induction which Aristotle had previously described, Galen considered he carried it further, and made it more practical.

In addition he applied it to medical treatment, thereby raising it, he thought, from an empirical to a scientifically proven study. With the crude arguments of Julian and other Thessalians ringing in his ears he endeavored to show not only their falsity, but their unreasonableness. In spite of his pride in the work, probable excerpts to be introduced later, reveal him far from being a profound philosopher. This is also revealed, however, in his "Natural Faculties" translated into English by A. J. Brock.[23]

Yet he is extolled by the German critic Ueberweg[24] who gives him credit in metaphysics for adding a fifth to the four principles of Aristotle (matter, form, moving cause and final cause), namely, the instrument or means which had been subsumed by the Peripatetic apparently under the concept of the moving cause. In addition he deserves some credit in connection with the fourth figure of the syllogism named after him, which was obtained by a repartition into two figures of the modes included by Theophrastus and Eudemus in the first figure.

He was influenced in the direction of logic and also toward mathematics and astronomy by the teachings of Hippocrates, as the following quotation shows (I, 53)[25] which is taken from an address to students in Rome entitled "The Able Physician is also a Philosopher":

> The lot reserved to the majority of athletes who, while aspiring to carry off the victory at the Olympic games do nothing to achieve it, awaits equally the majority of physicians. While lauding Hippocrates and considering him the

> foremost in the art, they do everything except the needful to resemble him. Hippocrates declared that astronomy, and all the more geometry, is of great service to medicine, yet physicians not only make no use of either one or the other, but find fault with those who do. Hippocrates taught it was necessary to learn with precision the constitution of the body, in fact that this was the basis of medicine. The present day physician goes through the study without learning the substance, form, structure or size of the various parts, their connection with one another or even their location. In a similar way, failing to learn the classification of diseases into their proper genera and species, they find therapeutic indications replete with pitfalls. It is Hippocrates who invites us to apply logic to the science, but far from taking it as a guide, physicians actually denounce those who study it as occupying themselves with the useless.

He was further influenced toward the conclusions of mathematics by his own studies in geometry in a similar way to Descartes[26] as is evident from the following, in which he says (XI, 256):

> Geometry demonstrates its first theorem by apriori reasoning, its second from the proof of the first, and thus continues to add one proposition after another, using all the previously acquired knowledge, until it eventually arrives, incredible as it may seem to the uneducated, not only at the magnitude of the sun, moon and earth, but at their distances. And through it have been invented and constructed sun-dials and water-clocks, which successfully anticipate the revolutions of the sun and moon and predict the occurrence of eclipses.

Again he tells us in more detail (XIX, 39):

> Hearing the various teachers promise that they would prove the points in contention, I listened to the celebrated stoics and peripatetics with the idea of learning positive demonstration. I acquired a few notions, especially in the way of logic, but found that on everything not absolutely apparent there were differences in point of view even among philosophers of the same school, among the Peripatetics to a small degree and among the stoics and Platonists to a great degree. Insisting on what I wished to learn, they appeased my desires by stating that I would at least be taught how to recognize in a demonstrative discourse of another whether a statement was true, or like a counterfeit coin appeared true while in reality false and with this capability my knowledge would be complete.

He continues:

> By the gods my preceptors taught such nonsense that I fell into Pyrrhonic doubt of all conclusions except those of geometry and arithmetic. These I learned from my father as he had from his father and grandfather. Seeing that eclipses occurred according to prediction and that clocks and water-clocks could be depended on, I decided the geometrical form was the best for the purpose of demonstration. For even when the philosophers differed among themselves on their own subject, they remained one in regard to the conclusions of geometry. On this account I decided not to use their methods, but confine myself to those of geometry. Whoever, then wishes to see the difference I advise to begin with them and then read the treatise on demonstration which I wrote in fifteen books.

This somewhat abridged quotation comes from the Catalogue of his works, which he wrote apparently rather hastily at about the age of sixty-seven, and his references to the philosophers are not to be taken as applying merely to those he listened to before he wrote this philosophical treatise, but more or less to all throughout his life. At this time in Alexandria he was only developing some of those ideas which became stronger as time advanced particularly after coming in conflict with a certain number of philosophers in Rome. It would point, however, to the likelihood that he did not neglect the philosophical teachers in Alexandria, but he was so little impressed and remained under their tutelage such a short time that he refuses even to name them. We know that at the time of Galen's sojourn Gnosticism was at its height and the city was filled with pseudo-philosophers endeavoring to combine the theological ideas of Judaism, Christianity and Stoicism with those of Plato.

Gnosticism was followed by Neo-Platonism and Prendergast[27] affirms that Plotinus and Neo-Platonism are probably more closely related to the efforts of Galen than is generally acknowledged. Ueberweg[24] also gives credit to our physician in its development when he states:

> Among the Pythagorizing and Eclectic Platonists who through their renewal and further development of the Platonic principle of transcendence in special opposition to Stoic Pantheism and Epicurean Naturalism became the precursors of Neo-Platonism are Maximus of Tyre under the Antonines, Apuleius of Madaura, Albinus and Severus of nearly the same epoch, Calvisius Taurus and Atticus, Galen, Celsus, the opponent of Christianity, and Numenius of Apamea.

The influence of Galen's writings is also shown in the "Miscellanies" (Stromata) and other works of Clement, the Christian Bishop of Alexandria about forty years later, expressing as he does so frequently the thought and sometimes the actual words of

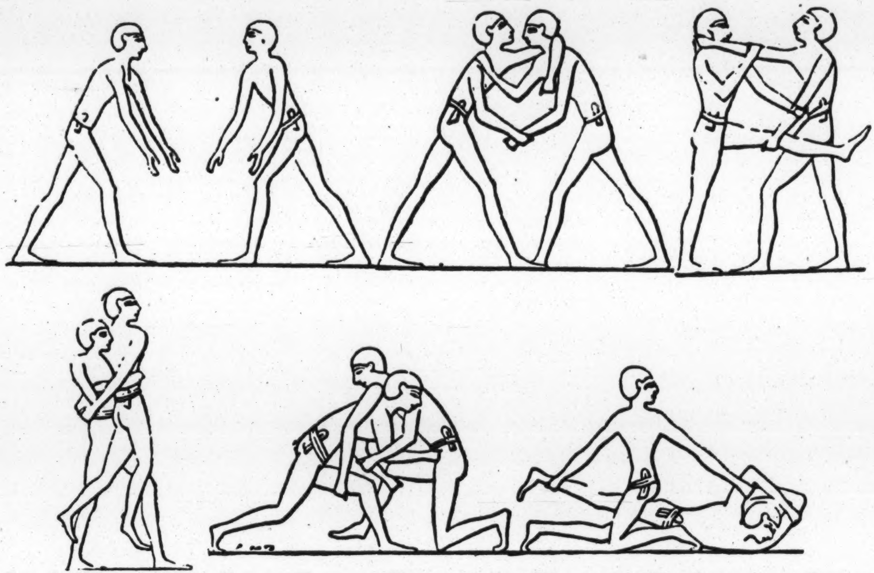


FIG. 6. "MINUTE MOVIE" FROM EGYPTIAN TOMB 2500 B.C. WRESTLING WAS ONE OF THE SPORTS COMMONLY INDULGED IN BY GALEN IN THE GYMNASIUM OF THE BATH, AND RECOMMENDED BY CLEMENT FIFTY YEARS LATER. (FROM MENARD.)[64]

the Pergamite, though he never mentions his name. For instance, the two forms of recreational exercise Galen most enjoyed were wrestling and ball-playing. These are the two particularly recommended by Clement.[28] Other and greater evidences will be adduced later.

When Galen states "he fell into Pyrrhonic doubt" he means something quite unlike what we popularly call skepticism. Our skepticism is a proper doubting till proof is established. It leads to accurate experimentation and eventually to truth. The skeptics of the second century denied that anything could be known absolutely and starting with this as a cornerstone they gradually arrived at the logical conclusion that knowledge was a bauble.

This did not prevent them from study, because as living social beings they were obliged to conform to natural laws, like eating, to civil laws, like refraining from stealing, and to social conventions, like caring for children. They learned how to conform to these, however, not because they were necessarily true or proper, but because otherwise life would be made too difficult.

The reason the skeptics were able to hold their own against adversaries was the small number of absolutely undisputed facts even in connection with the demonstrable sciences. Though the stone thrown into the air fell back to earth on every trial, they could not prove it would do so again, since unacquainted with the law of gravitation they failed to recognize the reason for its fall. Indeed the only facts generally granted were those proved by the senses and by mathematics. In geometry the proof was absolute that the combined angles of a triangle equal two right angles, or again as Galen puts it "water clocks could be depended on" because the water was contained in vessels of geometrically proved content thus allowing perfect regulation.

The Pergamite himself says of the skeptics (XIX, 52):

> There are many physicians and philosophers who not exercised in the demonstrative method lose their way in argument. Some even say there is not only no such thing as demonstration, but that nothing can be known absolutely, so that teaching and study are actually superfluous. In fact the more one talks to them the more stupid they seem to become.

Among medical men the skeptics were found in the sect of the Empirics who denied that anything could be learned by speculation and allowed themselves to be ruled entirely by experience. And even this was not certain but only likely.

Though this great philosophical work is lost, considerable knowledge of its general drift can be gained from thirty-nine articles which Galen informs us were written later in life to explain or defend certain points. The great majority of these are also lost, but the subject matter is indicated by the titles (XIX, 43):[29]

Proper employment of terms (written before 165 A. D.).[30] Against those who quarrel over words. Differentiation of the actual question under discussion from its title.[31] Significance of genus and species and related terms in ordinary language. Use of syllogisms. Use of theorems for syllogisms. Number of syllogisms. Logic and theory. A priori. Contingent propositions. Equally strong propositions. Conclusions from mixed propositions. Hypothetical principles. Quantity is inseparable from primary substance. Whatever exists is either one or more. In case of opposites it is impossible for one and the same to be by necessity a consequent. Things which arise through their own cause. Origin of things depending on their end. The necessary in demonstration. Propositions omitted in the treatise on demonstration. Teaching by means of demonstration. Indirect demonstration. Demonstration propter quid. Clitomachus (a leader of the New Academy about 120 B.C.) and his exposition of the demonstrative method. Induction.[32] Possibility. Similarity. Example.[32] Illustration. Judging discrepancies in doctrines. Discourses which confute themselves. Common knowledge. Subjects frequently discussed. Dialogues of a philosopher on common ideas. The constitution of the arts (part of it written for Patrophilus between 176 and 194 on the art of medicine is still extant I, 224–304). The common and special in the various arts. The best philosophical doctrine sustaining Epictetus against Favorinus (I, 40–52). Synopsis of the theory of demonstration. The best medical sect (I, 106–223) written for his friend Thrasybulus, apparently a director of physical training in a Roman gymnasium, about 177 A.D. In this last which may be read in the modern French of Daremberg[33] his arguments against the Empirics and Methodologists are finished and conclusive.

In addition Müller[21] made an exhaustive study of the references to this fifteen book treatise in Galen's extant works, and of the references of other writers which has given us further ideas.[34] From this research Müller concludes the first book was more or less introductory in which he showed that it was impossible to become a trained physician without a knowledge of demonstration. He also believes it contained a criticism of the looseness and vacillation of the Methodologists in similar or stronger fashion than even later writings.[35] In this and the second book were treated syllogisms and demonstration following the principles of Aristotle and Theophrastus.

The differentiation of these two terms made by the Christian Bishop Clement of Alexandria,[36] about forty years later we would judge to be that of Galen with whose works he was apparently familiar: To draw a conclusion from what is admitted is to syllogize, to draw a conclusion from what is evident to the senses or understanding is to demonstrate. In the way of the former—we deduce from several admitted points that Pytho betrayed the Byzantines;[37] in the way of the latter—to be with child is demonstrable proof of being no longer a virgin.

Knowing as he and his readers did that Aristotle had dealt rather thoroughly with the entire subject of proof, Galen began with syllogisms and led up to and compared them with demonstration. He took up the former only to the extent necessary. A glance over the previously mentioned thirty-nine articles shows a number referring to matter in the first two books and the same will be true in connection with subsequent ones. Likewise his dissertation on the Best Medical Sect to Thrasybulus (I, 106–223) indicates how he developed theorems and premises in connection with demonstration.

In the third book he analyzed different kinds of premises in regard to their practical usefulness and demanded that they be evident either to the mind or the senses. He is probably referring to this part when he says in his great Therapeutics written twenty years later (175 A.D.) for Hiero (x, 39): "In this work on treatment I expect to use the methods I explained in my treatise on 'Demonstration.' Here we showed that the basis of every demonstration must be apparent to the senses or to the intelligence, and that the describing terms must be accurate."

In the same work in a polemic against Thessalianism, he elucidates what he means by apparent to the senses and to the intelligence. He also shows the influence of his studies in geometry, of which he was so proud, and some of which he probably pursued in Alexandria where Ptolemy was at the time or had been just previously advancing its status. He says (x, 32):

> The great majority of physicians make unproven principles the basis of their art, and from these pass to others. They do this because they never studied philosophical demonstration, just as if they would reckon the size of a sphere, cube, cone, cylinder, or similar figure without a knowledge of either arithmetic or geometry. And as ridiculous as anyone makes himself who asserts that the surface of a right-angled triangle one side measuring five feet, the other twelve feet is not thirty square feet but forty, without bringing proof, so ridiculous is he who asserts what he cannot prove in medicine.
>
> This conclusion in regard to the triangle is based on two propositions, namely, that a rectangle with sides of twelve and five feet has a surface of sixty square feet, and that a right-angle triangle is half this size. To obtain each of these conclusions other propositions are necessary until one is eventually reached which is self-evident, and requires no proof. In the same way, we must refer everything back which is to be proven in medicine to fundamental self-evident principles.
>
> If this were done in scientific investigations on the treatment of disease, physicians would find themselves in agreement not dissimilarly to geometricians, arithmeticians and logicians, who are obliged to learn at the very beginning the meaning of every term used and what undemonstrable propositions, commonly called axioms, will be accepted; for instance, that a line contains only length but not breadth, a flat surface length and breadth, that this is a triangle, that a quadrangle, etc.; when two things are equal to a third, they are equal to each other, if like is added to like it produces like. With the ground principle known and acknowledged they gradually build up their theories.
>
> If the majority of physicians were asked on what they based their belief, they are, as you know, my dear Hiero, entirely incapable of bringing forward the ground principles which are acknowledged by everybody and require no proof. They are, however, experienced in the art of Euripus,[38] and frequently assert in the course of their exposition the opposite of what they stated at the beginning as a basic principle. Thus, for instance, this most sapient Thessalus, after he has told us that the communities are apparent, insists that no other physician recognized them before himself, not even Themison, the founder of the Methodologist sect.

According to Galen (I, 81) Thessalus defined Methodology as "the knowledge of the communities which relate to health and are necessary to it." This means the knowledge of the condition of the pores of the body since disease consisted in their being too tight or too loose. He continues (x, 35):

But all Methodologists differ from one another as well as from Thessalus, not only in regard to the communities, but everything else. I am now repeating what I have already said to you in the presence of Methodologists—and I will probably write more on the subject of their differences when I have the leisure. At present it is sufficient to point out the duty lying at the door of the defenders of the sect, namely, to explain the meaning of the terms they use as the Empirics do. The Empirics, for instance, say what is evident to the senses is apparent, what is evident only to reason is better described by the word known. We would like to ask the Methodologists are your communities apparent to the senses? Or do you use this same term for what is comprehended only by reason?

It is true the old philosophers considered both as apparent, namely, what is observed by the actual senses like white, black, hard, soft, warm, cold and what is recognized only by the understanding, like the propositions two things similar to a third are similar to one another; and like added to or subtracted from like equals like.

Of this kind, also, are the pronouncements: Nothing happens without cause, everything comes from something already existing and from what does not exist nothing can arise; nothing can happen to what does not exist, and everything must either exist or not exist. To this category likewise belong many other statements treated in logic about which I have myself spoken as plainly as possible in my work on Demonstration.

The followers of Thessalus write hundreds of books treating of what he meant and such trifles as with whom he agreed, instead of explaining what these apparent communities [the evidences of tightness and looseness of the pores] are, and how they are apparent. Yet, if they wrote a thousand times as many, the information would still be lacking. For what is apparent must be evident either to the senses or to the understanding without the necessity of special demonstration. What is not evident on first glance is at least debatable, requires demonstration and can be made a basis for no branch of science.

Eventually leaving the Thessalians and proceeding nearer to the actual subject of treatment he continues (x, 40):

Desiring to evolve a cure for every disease, it is necessary at once to differentiate one from another. If it prove impossible to make this differentiation according to genus or species on account of incomplete knowledge, we must first determine what disease is.

What is the proper method of going about this? What other than that I have already explained in my work on "Demonstration." Agreement on certain fundamental propositions being evidently necessary, we will take up one conceded by all, else it could not be correctly designated a basic principle. What proposition in regard to illness is universally conceded? In what cases do all use the term "sick"? When every part of the body does its work perfectly, do not all say they are well, and consider they require a physician least? But when individual functions are performed badly, or not at all, do they not then believe they are sick in the part of the body in which the function is disturbed, and on this account consult a physician? I, at least, believe all men thus differentiate health and disease. [As can be seen Galen antedated Thomas Henry Huxley in defining disease as a perturbation of function.]

They make this distinction not only in words, but in understanding, considering healthy the one who shows no disturbed function; and sick, the reverse. For instance, they consider him healthy whose legs functionate normally; and sick, if they are incapacitated. Every Greek uses this term in this significance, as we have shown in our "Dictionary of Medical Terms." And I would like it to be understood I will follow the Greeks in their definitions, as I have done in my work on "Demonstration."

In connection with this investigation I will not allow myself to be governed by popular opinion, but will adhere to the scientific methods I have already described. We will first accept the ground principle conceded by all that it is necessary in every method of cure to return health to the diseased body, that is restore proper function to disturbed parts. For the sake of clearness, we will take up several components of the body and explain what we mean.

The first we will consider is the eye. Both physicians and laymen without exception allow that the eye is necessary for seeing. Whether I call this an activity or an action means nothing for the moment. Further, what will it matter if one says that the work of the eye is sight, and another vision? It is only necessary that he explains what he means. Again we may call the eye a part or a particle of the body without hindrance to the investigation, for that which makes a whole complete may be named either. Likewise, to make a distinction between the terms entire and undivided is to show a lack of knowledge of Greek, but we have spoken at length elsewhere on the use of terms.

I will only take up now what is necessary for the present purpose so as to avoid error through the belief that those using different terms necessarily think differently in regard to the thing itself. As you know, our present day physicians are like the majority of our present day philosophers, too little educated in these matters, and only a very small number know how to differentiate the name from the thing itself.

In our studies in logic, we have shown the proper course, namely, to proceed from the difference of things not of words. It is, therefore, necessary to give an exact designation to everything, and then see it is strictly adhered to. Only by this means will our teaching be free from obscurity, the non-pertinent be recognized, what is lacking quickly discovered and agreement or disagreement become plain.

This appears like a lengthy explanation of a rather simple matter, but it is to be recalled that he was writing for students listening to sophists and so-called philosophers with quibbling definitions and illustrations, who loved to argue and were capable even when wrong of being very plausible. Similar discussions were frequent and the following from the pen of Bishop Clement, about fifty years later, is only one example:[36]

If the belief of a point, that is not admitted be carried back to one admitted by all, that is to be made the commencement of instruction. Every term advanced is to be converted into an expression admitted by the participants in the discussion. This is to form the starting point and lead the way to the discovery of the points under investigation. For example, let it be the term "sun," which is in question. Now the Stoics say that it is "an intellectual fire kindled from the waters of the sea." Is not the definition obscurer even than the original term, and requires at once another demonstration to prove if it be true? Hence it is better to say in plain and distinct language that "the sun is the brightest of the heavenly bodies." For this expression is clearer, more credible and is likewise admitted by all.

Discussing as Galen does in this part also classification, we have no doubt Thessalus' reduction of the number of diseases to two came in for criticism not unlike that we read in his work on therapeutics. In this he states (x, 20):

We can only liken Thessalus to a tyrant when he insists that there are merely two diseases—the tight and loose—without comprehending that these represent differences, which as I have previously shown the old physicians recognized, though none of them exhibited such ignorance as to suppose the differences to be the diseases themselves.

This error of Thessalus is so evident as to be remarked by even a properly educated boy. Yet, it has O Jupiter and ye gods, carried him to such lengths that he believes he has discovered something great and wonderful; not knowing that it is not allowed if asked, for instance, about the number of animals to answer with a single opposition having to do merely with differences. . . . For in this way the whole living world can be divided into two parts in many different fashions. . . . Only when we respond horses, oxen, dogs, men, birds, bees, fleas, lions and name the rest according to species is our answer correct. If we even name many and add that we can not name them all, we will still have given a correct answer. . . .

In the same way, speaking of the number of diseases, we must not stop on the first differentiation, but continue until no further division is possible. This can only be done after the study of the science of classification as explained in Plato's Philebus, Sophist and Statesman. That it is difficult is evident from Aristotle's first book on the kinds of animals in which he endeavors to enumerate the differences, yet after proceeding far, pronounces his conclusions with hesitation and timidity. Though Aristotle and Plato have shown classification to be extremely difficult and Theophrastus and other philosophers agree with them, our bold Thessalus authoritatively asserts that there are only two diseases, a third being constituted artificially out of a combination of both. . . .

Calling yourself Methodologist, you boast that you made this discovery by means of method [that is by means of logic]. If this is true, why not tell us how it was done? Exactly the opposite is true, however, you arrogant far from methodical [logical] man. You have built a structure without a foundation at which it was necessary to begin in order to unfold the peculiar species and differences. . . .

The logical method affords the means of arriving at proper conclusions, and for the proof of the correctness of these conclusions, all men use two criteria—reason and experience. If someone asks why we give cold water to a fever patient, we have two answers: The first relates to the origin and nature of the fever, and the nature of cold water [logical contraries]. In this way we try to show how in this disease or in this or that period, cold water is suitable. The other has to do with something else entirely, namely, experience, because in this or that disease, or on this or that occasion cold water appeared often to be beneficial. In my opinion Thessalus must either make experience or reason the basis of his observation, and not like a tyrant order us to believe what he wishes without proof.

The fourth book of this great philosophical treatise dealt with the probable. In his work on the Teachings of Hippocrates and Plato (v, 273) he describes four kinds of premises: The first scientific and capable of being demonstrated; the second logical; the third probable, capable of being defended rhetorically; the fourth sophistical.

Among the conclusions put by the Pergamite in the probable category are many relating to religious belief, like the eternity of the world, the inevitability of death, and the conception of a non-material soul in the human body. Galen believed that God and Matter were eternal, but that the world was created. He believed in a spiritual soul. He recognized that experience stood for the inevitability of death, but was willing to allow that sufficient knowledge might eventually be gained to control it.

This question of death and the prolongation of human life was discussed not only by the medical, but by lay men. According to Clement[39] a certain Artorius, in a work on long life, insisted that for its attainment drink should be taken at meals only to the extent of moistening the food. The good Bishop quotes him with the idea of inculcating temperance since wine was the principal beverage.

A philosophical charlatan, apparently named Philippus, as Galen recounts (VII, 670; X, 495) wrote a treatise at the age of forty, on "How to Prevent Old Age," though at the age of eighty he himself presented the Hippocratic facies—the features of impending death. When he was laughed at for teaching others how to prevent old age while he himself showed all the signs, he published another edition in which he still claimed that eternal youth was possible, but only with care from childhood.

As a consequence children were actually put under his charge, but even before they grew up he had paid his tribute to nature. People in general considered him crackbrained, but Galen merely reckoned him with the many theorists who are led by plausible arguments to inferences which stand in opposition to the results of observation and experience. The Pergamite adds (VII, 671) "though the conclusion appears to be correct that everything begotten will die, it is not to be looked on as scientific or necessary, but only as probable, as is shown in our work on Demonstration."

In connection with this subject of the prolongation of life Galen describes a case (VI, 343) similar to a number Metchnikof met with in Bulgaria:

> We were acquainted with an old farmer more than one hundred years old, whose principal nourishment was goat's milk which he took sometimes with bread broken in it, and again with bread spread with honey or with tops of thyme baked with the bread. With the thought that the goat's milk had prolonged his life, another, imitating him, suffered continually, no matter how he took it.

In this regard the Methodologists had an advantage over other sects in the way of an argument which they undoubtedly frequently employed. Their progenitor Asclepiades insisted that when disease arises nature does nothing to aid, and it is the physician who cures. With the self-confidence of the mountebank he stated that if he fell ill, he would give up his title to physician. And he won his bet with fate, for living to the age of ninety, he met death not by disease, but by a fall from a ladder.[40]

[*To Be Continued*]

[From Fabricius d'Acquapendente: Opère Chirurgiche. Padova, 1684.]

EDITORIAL

BENJAMIN RUSH, A BURGESS AND GUILD BROTHER OF THE CITY OF EDINBURGH

THE minutes of the city of Edinburgh, Scotland, of May 4, 1767 record that: "The Council admits and receives Richard Stocktoun, Esq. of New Jersey, Counsellor at Law, Burgess and Guild brother, gratis; and Benjamin Rush, Esq. of Philadelphia, Burgess and Guild brother, gratis." No reason is given but this was not unusual; the Council minutes show that frequently this honor was conferred without any explanation. Harvey was made a Burgess and no reason assigned, but he would be known to the citizens as a distinguished physician. But it is not so evident why this honor was given to Richard Stocktoun; what interests us especially is why it was conferred on Benjamin Rush, a student at the University, little more than six months after his enrollment in the medical school and while still in his twenty-first year.

The honor of Burgess and Guild brother might be conferred for one of several reasons, Guild brother being the greater honor.[1]

1. The recipient might be made a Burgess because his father was a Burgess.

2. The applicant, having served his apprenticeship to a Burgess and Guild brother and proved his ability by submitting to tests, could become a Burgess and a Guild brother with right to work in the city.

3. Married to his master's daughter, he could become a Burgess by right of his wife.

4. The right of Burgess might be purchased and with it the privileges of a Guild brother.

5. It was a compliment paid a distinguished visitor and at the same time might be conferred on one or more persons connected with him, gratis, i.e., without a fee being required. Thus the records show that Benjamin Franklin of Philadelphia was made a Burgess and Guild brother, gratis, by Act of Council and at the same time his son William Franklin. The honor thus conferred did not give the rights of the preceding Guild brothers.

The usual procedure was that names be submitted at a Committee meeting by some influential friend and then presented at an ordinary meeting of the whole Council, when the recipient was presented with a ticket. There was required an oath of allegiance to the city and to the ruling house. Rush must have been present, otherwise the record would have read *in absentia*.

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[1] For this information I am indebted to Miss Marguerite Wood, Archivist of Edinburgh Council Records.

Neither the name of Stocktoun nor that of Rush appears in the list of Burgesses for it was not usual for those receiving this honor to have their names entered on the Burgess roll. This courtesy title gave the individual distinction in the community and no doubt a certain amount of distinction and safety while travelling abroad, especially in England or in Holland, with which country at this time Scotland had intimate relations.

It appears to me that Rush was made a Burgess and Guild brother because of his association with Stocktoun and that Stocktoun had the honor conferred for the following reasons.

Richard Stocktoun, a Trustee of the College of New Jersey, was empowered by the Regents to notify the Rev. Dr. John Witherspoon, Presbyterian minister at Paisley, that he had been chosen as president of the college to succeed Dr. Samuel Finley. Rush was a graduate of the College of New Jersey and an ardent supporter of the mission of his future father-in-law Richard Stocktoun. In the city of Edinburgh, where the clergy were distinguished intellectually and prominent socially the message of this delegate would mark him as an individual of distinction in America. The Rev. Dr. Witherspoon, a son of the manse, a descendant of John Knox, a graduate of Edinburgh, had proved his ability in church affairs. He had been especially active during the acrimonious discussion which followed the production of the play "Douglas" written by the Rev. John Home, a Presbyterian minister, when, voicing the views of the majority of the clergy, Dr. Witherspoon wrote a "most formidable" treatise against stage plays in general and on the relationship of the clergy to the theater.[2] The esteem in which he was held and the interest aroused by his acceptance of the office of president of Princeton may be judged from the publication of his farewell sermon in the Scot's magazine of March 1768, which magazine in a later number, May 1768, gives an account of his reception in Philadelphia and in New Jersey. For some years the Presbyterian clergy and many of the laity in Scotland had been interested in the well-being of the College of New Jersey. In 1753 two representatives came to Scotland from America, a Mr. Tennent and a Mr. Davies, seeking funds to aid the college. They appeared before the General Assembly of the Church of Scotland and obtained "an appointment for general collection," probably the right to raise funds in certain presbyteries.[3] But what was of more universal interest in Scotland at this time was the controversy between the mother country and the American colonies regarding taxation without representation, less bitter since the recent repeal of the Stamp Act. That the controversy was followed with close attention and with divergent views is evident when one consults the files of the Scottish newspapers of this period. These facts throw light on the decision of the Town Council to honor the delegate who came to secure Dr. Witherspoon as President of the Presbyterian College of New Jersey, and at the same time to confer the honor of Burgess on the delegate's friend Benjamin Rush.

J. GORDON WILSON

Chicago

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[2] Bowers' History of Edinburgh University, Vol. III, p. 73.

[3] Rev. John Gillis, D.D. Memoirs of the Rev. George Whitefield. N. Y., 1798, p. 134.

BOOK REVIEWS

The Doctor and the Public. A Study of the Sociology, Economics, Ethics, and Philosophy of Medicine, Based on Medical History. By James Peter Warbasse, M.D. N. Y., Paul P. Hoeber, Inc., 1935.

This book based on medical history correlates medical science and the public welfare. Medicine is presented as a social force and conversely the effect of social trends on the evolution of medicine is discussed.

The author has used the vast field of medical history as a background for the study of present-day medical problems. A vast amount of historical information is interestingly and accurately given. The relations of the practitioners of the healing art to society are traced from the earliest times to the present and the importance of such a historic perspective is emphasized. The cultural broadening obtained by the study of medical history gives the physician a wider outlook and aids his attack on modern problems and familiarity with medical history on the part of the laity would aid its judgment of real values in medical science. Medical history is a part of all history and medical discoveries have often been productive of greater changes than wars or politics. An interesting picture is drawn of the world as it might be today if medical knowledge had not progressed. The great healing power of nature is stressed. "This power has been the colleague of doctors of all time. It has given the incompetent prestige, healed where doctors have failed, undone the mistakes of the ignorant, insured the prosperity of fads and cults, made quackery possible, filled the coffers of charlatans, and saved the human race."

The author gives a vivid comparison of the doctor of olden times with the busy physician of the present day. The former could possess all of the available medical information, attend to his practice and still have time to pursue knowledge in other fields. Many great scientists, artists, philosophers, and statesmen came from the profession. The modern physician is engrossed in obtaining special knowledge and bettering his professional standing. Better doctors are the result and more disease is prevented and cured, but perhaps at the expense of character and culture.

The physician's place in society is discussed in detail. The author feels that the solution of the present medical problems is to be found in expanding the functions of the medical profession rather than diminishing the number o fdoctors. The vast field of preventive medicine has hardly been touched. Medicine has improved greatly the quality of life. This has been accomplished coincidently with the attempt to increase the quantity of life. "What might it not accomplish were it to make quality as well as quantity its object?" In the present state of society the physician is in the position of a commodity. To the medical profession comes the problem of showing society how to make larger use of its medical talent.

Attention is called to the common misconception that the socialization of medicine means political control. A non-political socialization is possible and exists in many countries today. The discussions of medicine as an art, as a science, as a profession, and as a business are interesting and practical. The methods by which medical services may be brought to the people are elaborated in detail. In the present capitalist economic method emphasis has been placed on production with an eye wholly to profits. The interests of the consumers have been neglected and as a result they suffer want in the presence of plenty. This is true in medicine as well as in the business world. The author feels the consumer is entitled to some voice in the administration of medical services. The intimate contact between the family physician and the patient, which seems to be disappearing under our present system, should be preserved. As the most logical solution to the problem a plan of group cooperation is suggested. This is a combination of a consumers' cooperative organization and a medical group, each to be independently organized and controlled.

The development of medical service as a social rather than a commercial enterprise is gradually advancing. If the medical profession does not plan its own course the people themselves will make the change. The change the people will make is apt to be the easiest one—State Control.

The final discussion of the physician as an individual is rich in philosophy and good advice to the members of the profession. Dr. Warbasse's approach to a difficult problem is a unique and effective one. The book is to be recommended both to physicians and their patients as an impartial and timely review of important subjects uppermost in the minds of both.

Ausfall des Coitus als Krankheitsursache in der Medizin des Mittelalters.

By Dr. Gunter Elsasser. Berlin, Verlag Dr. Emil Ebering, 1934.

Elsasser has translated an interesting medieval letter written by Johann von Wesel in which the writer discusses the question whether monks may fall ill if they are true to their vow of chastity and if as a preventive of such illness artificial discharge of seminal fluid may be advised. While not recommending coitus or onanism, Wesel maintains that a discharge is not sinful if it occurs without a clearly expressed will to carnal lust and with the avoidance of lustful sensations. Several years after the composition of this letter Wesel was cited before the heresy court at Mainz and condemned to the recantation of his writings and to imprisonment in the cloister. The present brochure contains a Latin text of the letter and the German translation.

David Riesman.

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